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NUTRITIONAL COMPOSITION OF GANDANA (*ALLIUM ASCALONICUM* L.)

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The leaves of *Allium ascalonicum* L., locally known as 'Gandana' has been recently introduced by Afghans and is used both as vegetable and salad. With a view to assess its nutritional value, moisture, fibre, protein, ether extract and ash content of the vegetable were, determined alongwith sugars, total acidity and ascorbic acid. Among the minerals calcium, iron, magnesium, manganese, phosphorous, potassium and sodium have been estimated and report.

Key words : Gandana, *Allium ascalonicum* L., Proximate chemical composition.

Introduction

Nutritive value of the vegetable of daily use has long been a subject of interest to Bio-chemists and Agriculturists in different parts of the world. In our country such type of work has been carried out by Chughtai [1]. In these laboratories also work has been carried out on various aspects of some of the vegetables, and the data regarding the common cultivated vegetables [2], edible wild plants [3], roots of *Nymphaea lotus* L. [4] and Kachnar [5] of the North West Frontier province of Pakistan have been published from time to time.

Of late a green vegetable leaves locally known as Gandana, has been introduced by the Afghans, which is grown and marketed extensively at present and is gaining popularity among the local people. It is now cultivated in Peshawar area on a large scale. The plant is propagated both by seeds and by bulbs. Inspite of a large scale cultivation and use of the vegetable, no information regarding its composition and nutritive value, is presently available in the literature. It was, therefore, considered necessary to undertake a thorough investigation of the chemical constituents of Gandana with a view to assess its nutritional value and mineral contents.

Materials and Methods

The vegetable locally known as Gandana (*Allium ascalonicum* L.) was procured from the local market during the summer and winter season of 1987 and 1988. Efforts were made to perform experiments on material in as fresh a condition as possible. The vegetable was weighed and then subjected to thorough washing. It may be mentioned that the edible portion constitute 100% of the fresh vegetable. Moisture, fibre, protein, ether extract and ash were determined by the AOAC methods [6]. Total and available carbohydrates were determined by difference. Calorific values were calculated on the basis recommended by the Bureau of Human Nutrition and Home Economics [7] followed by FAO [8]. Random samples (in triplicate) were weighed and homogenized in a liquidizer. Aliquots of the vegetable in this form were used for analysis of sugars, titratable acidity and ascorbic acid, according to the methods of AOAC [6]. Calcium, iron, magnesium, manganese, phosphorous, potassium and sodium contents of this vegetable were also determined. Calcium was estimated in the ash solution. The solution was prepared in a manner consistent with that of AOAC [6]. Calcium was precipitated as calcium oxalate and the filtrate and washings obtained after filteration were used for magnesium determinations. The precipitate was dried, ignited and weighed as $Mg_2P_2O_7$. Correction for $Mn_2P_2O_7$ was, however, made while reporting magnesium. Iron and phosphorous were also investigated in the ash solutions as prepared above. The estimation were made by Spectrophotometric method. A Shimadzu double beam Spectrophotometer UV 200S was used for these measurements. Sodium and potassium estimations were made by flame photometric method [6]. A Jenway PEP 7 Model digital flame photometer with sodium and potassium filters was used.

Results and Discussion

The proximate chemical composition and mode of consumption of the plant studied is shown in Table I. Gandana is a leafy vegetable bearing several crops, and the edible part constitute 100% of the plant. Moisture content of Gandana was found to be 90.2% as against 86.9 to 94.5% for the commonly cultivated leafy vegetables [2] (i.e. Band Gobhi, Kulfa, Palak, Methi, Salad, Dhania and Podina) and 74.7 to 89.3% for edible wild plants [3] (i.e. Paishtarey, Pandeyrakh, Ganhar, Chalkhey, Kachmachu, Batho, Bashka, Kajberey, Shaftal, Khub Kalan, Liveney, Tirwakey, Josaga, Podina jangli and Walkharey) grown in the area, (Appendix 1 for Botanical names). It, therefore, falls within the range reported for the vegetables of the Region, but is in general about 1-18% higher than the moisture content of most of the wild plants produced in the area.

The protein content (3.1%) of the plant on fresh weight basis is quite appreciable when considered on dry weight

TABLE 1. PROXIMATE CHEMICAL COMPOSITION* OF GANDANA (*ALLIUM ASCALONICUM* L.)

Basis	Edible portion %	Moisture %	Protein %	Ether extract %	Ash %	Carbohydrates (%) Total	Fibre	Available	Calorific Value, %	Mode of consumption
Fresh	100	90.2	3.1	0.4	1.5	4.8	2.5	2.3	25.2	Raw/cooked.
Dry	100	11.3	28.0	3.6	13.2	43.9	22.3	21.6	230.8	
Moisture free	100	00.00	31.6	4.0	14.9	49.5	25.1	24.4	260.0	

*Mean of triplicate determinations.

basis (28-31%). These values are, in general, higher than those of most of the vegetables commonly consumed in fresh state [2]. The quality of protein could not be assessed but in the light of the reports that leaf proteins contain a reasonable amount of essential amino acids including lysine [9] it can safely be assumed as good in quality. Quantity-wise the plant could prove to be very good supplemental source of the protein requirement and hence the maintenance of health particularly amongst the poor class - of whose diet Gandana is an important part. The total carbohydrate content when compared with other vegetables falls within the range, but is nevertheless, on the lower side. In case of the vegetable being a major dietary component, it could, also contribute a reasonable amount of calories to the daily requirement as can be judged from its calorific value (Table 1).

Sugars, acidity and ascorbic acid contents of this material has been presented in Table 2. The total sugars content of 1.1% comprises 0.6% of reducing and 0.5% of non- reducing sugars. The plant is apparently more acidic (0.2%) than other leafy vegetables. Table 2 also shows that Gandana is a good source of ascorbic acid (24.1 mg/100g) when consumed raw, as salad, it could provide a reasonable amount of the daily requirements of ascorbic acid in the diet. Though the maximum and minimum limits of ascorbic acid for cultivated and wild edible leafy plants reported in literature [2,3] ranges from 19.6 to 92.3 and 66 to 229 mg/100 g respectively (as on their fresh weight basis), Gandana (with 24.1 mg/100g) could also be placed amongst the reasonably good sources of vitamin 'C'.

TABLE 2. SUGARS, ACIDITY AND ASCORBIC ACID* OF GANDANA (*ALLIUM ASCALONICUM* L.)

Basis	Sugars (%) Reducing	Non-Reducing	Total	Total acidity %	Ascorbic acid mg/100g
Fresh	0.6	0.5	1.1	0.2	24.1
Dry	5.8	4.4	10.2	1.8	218.1
Moisture free	6.5	5.0	11.5	2.0	245.9

*Mean of triplicate determinations.

Table 3 shows some of the mineral constituents of Gandana. It is apparent from the Table that this vegetable is very rich in minerals particularly iron, which is highest amongst the values reported for vegetables from these Laboratories [2,3]. Values of other minerals (K, Mg, Na and Mn etc.) of Gandana is also appreciable and, in general, falls within the range reported for other vegetables from these Laboratories[2,3]. To conclude, it can be gathered from these findings that Gandana can be classed as one of the nutritive vegetables produced in NWFP particularly with regard to its protein and mineral constituents.

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TABLE 3. SOME MINERAL CONSTITUTENTS* OF GANDANA (*ALLIUM ASCALONICUM* L).

Basis	Potassium mg/100g	Iron mg/100g	Magnesium mg/100g	Phosphorus mg/100g	Calcium mg/100g	Sodium mg/100g	Manganese mg/100g
Fresh	76.4	56.2	54.8	42.5	27.6	23.1	0.8
Dry	691.9	509.0	496.0	385.0	250.0	209.5	7.5
Moisture free	780.0	573.8	559.2	434.0	281.8	236.2	8.5

APPENDIX I. BOTANICAL NAMES OF THE CULTIVATED AND WILD EDIBLE PLANTS ARE GIVEN AGAINST THEIR LOCAL NAMES WHICH ARE USED IN THE TEXT.

S.No.	Local Name	Botanical Name
A. Cultivated		
1.	Band Gobhi	*Brassica oleracea* L.var. *capitata L.*
2.	Dhania	*Coriandrum sativum* L.
3.	Kulfa	*Portulaca oleracea* L.
4.	Palak	*Spinacia oleracea* L.
5.	Methi	*Trignella foenumgracum* L.
6.	Salad	*Lactuca sativa* L.
7.	Podina	*Mentha viridis* L.
B. Wild		
1.	Paishtarey	*Medicago denticulata* Willd
2.	Pandeyrakh	*Malva montana Forssm*
3	Ganhar	*Amaranthus blitum* L.
4.	Chalkhey	*Rumex dentatus* L.
5.	Kachmachu	*Solanum nigrum* L.
6.	Batho	*Chenopedium album* L.
7.	Bashka	*Lepidium sativum* L.
8.	Kajberey	*Taraxacum officinale* Weber
9.	Shaftal	*Trifolium resupinatum* L.
10.	Khub Kalan	*Sisymbrium irio* L.
11.	Liveney	*Medicago hispida* Gaertn
12.	Tirwakey	*Oxalis corniculata* L.
13.	Josaga	*Ghenopodium murale* L.
14.	Podina Jangli	*Mentha sylvestris* L.
15.	Walkharey	*Portulaca oleracea* L.

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(Contd Appendix I)

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