

Carbohydrate and Mineral Content of Chyote (*Sechium edule*) and Bottle Gourd (*Lagenaria Siceraria*)

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INTRODUCTION

Carbohydrates are the main energy reserves in the plant foods, carbohydrates are of two types viz. available carbohydrate which includes starches and sugar and non available carbohydrate including crude fiber and different dietary fiber constituents. In vegetable major part of carbohydrates is present as non-available carbohydrate also known as dietary fiber and dietary fiber possess significant hypolipidemic effect when included in the diets (Aggarwal and Chauhan, 1989). Although both chyote and bottle gourd belongs to same family, yet nutritionally and physiologically these are different in nature. Bottle gourd is a widely consumed summer vegetable in India, where as chyote is a less familiar vegetable, but this crop is gaining popularity and importance. Some information is available on the carbohydrate and mineral content of bottle gourd, but much information is not there as far as chayote is concerned. So in the present study we have made an effort to analysis and compare the available carbohydrate, dietary fiber constituents and mineral content of chayote and bottle in peeled and unpeeled samples.

MATERIAL AND METHODS

Chayote (*Sechium edule*) and bottle gourd (*Lagenaria siceraria*) were procured from the local grower of Palampur, Himachal Pradesh (H.P.) during rainy season. These were sorted and rotten vegetables were discarded. Vegetables were then washed with water and left on the table for aeration and drying. These were then divided into four lots. One lot from each vegetable was peeled and cut into small pieces. Second lot from each vegetable was kept unpeeled. Samples were then dried in electric dehydrator at $46\pm 2^{\circ}\text{C}$ for 36 hrs. After properly drying, samples were ground in a willy mill to pass through a 40 mesh sieve and stored in refrigerator in airtight plastic containers till further analysis were completed. Starch was estimated by method of Clegg (1956). Sugars (total sugars, reducing sugars and non-reducing sugars) were determined by methods of

Lane and Eyon as described by Ranganna (1995). Neutral Detergent Fiber (NDF), Acid Detergent ADF) and Lignin were determined by method of Van Soest and Wiens (1967). Difference between ADF and lignin gave cellulose. Minerals via; potassium, copper, manganese, sodium, calcium and iron were analyzed using atomic absorption spectro-photometer. (A.A 175) Phosphorus was determined by the method of Chen et al. The data were analysed for analysis of variance (Sendecor and Cochran, 1966).

RESULTS AND DISCUSSION

Higher starch content was found in the with peel samples of bottle gourd as compared to similar counter part of chyote (Table 1). As is clear from the table, without peel samples of both the vegetables had higher starch content as compared to their with peel counter parts. Non-significant difference was observed in the starch content of both the vegetables. The less starch in the with peel samples can be due to the reason that peel contains more of un- available carbohydrates whereas flesh contains more available carbohydrates. Earlier workers have reported 1.08% (Rani and Kawatra 1990). Significantly higher total sugars were there in without peel samples of bottle gourd (8.21gm/100gm) as compared to its with peel counter part and were also higher than without peel samples of chyote. Similar was the trend for reducing sugars. Without peel samples of both bottle and chyote contained more amount of total sugars and reducing sugars (Table 1). Non-reducing sugars were significantly higher in the with peel samples of both the vegetables when compared with each other and also with their without peel counter parts. Higher total sugars in the without peel samples can be due to fact that flesh portion contained more sugars as compared to the peel which is rich in fiber.

Significantly ($p < 0.05$) higher amount of reducing sugars were there in the peeled samples of both the vegetables when compared with their respective with peel counterparts (Table 1). Reducing sugars were maximum in peeled

Table 1: Carbohydrate and dietary fiber constituents of chayote and bottle gourd (g/100g dry weight basis)

Attributes	Chayote		Bottle gourd		CD ($P < 0.05$)
	With Peel	Without Peel	With Peel	Without Peel	
Total Sugard	6.09	6.69	5.87	8.29	0.22
Reducing Sugars	5.32	6.42	5.22	7.92	0.23
Non-reducing Sugars	0.77	0.47	0.65	0.29	0.03
Starch	1.22	1.56	1.31	1.57	0.10
Curd Fiber	5.59	4.41	4.45	3.40	0.02
NDF	25.73	24.19	22.71	21.16	0.18
ADF	17.55	16.65	16.26	15.67	0.57
Hemicelluloses	6.16	7.55	6.45	5.58	0.66
Cellulose	17.28	16.42	16.07	16.40	0.58
Lignin	0.267	0.230	0.193	0.167	0.008

Table 2: Mineral content of chayote (*Sechium edule*) and bottle gourd (*Lagenaria siceraria*) (mg/100gm) dry weight basis)

Mineral	Chayote		Bottle gourd		CD ($P < 0.05$)
	With Peel	Without Peel	With Peel	Without Peel	
Calcium	814.00	344.00	80.20	52.78	27.10
Iron	12.33	4.00	11.87	2.33	1.01
Phosphorus	289.87	259.00	240.33	187.33	14.57
Potassium	3350.00	3378.67	3320.00	3356.67	17.05
Zinc	3.70	2.77	3.77	3.47	0.36
Magnesium	182.33	147.00	162.33	146.33	0.98
Copper	0.22	0.25	0.19	0.24	0.03
Sodium	31.33	36.00	27.88	36.68	0.31
Manganese	0.33	0.38	0.26	0.31	0.03

samples of bottle gourd, but trend was just opposite for non-reducing sugars. Higher amount of non-reducing sugars were there in the with peel samples of chayote as compared to its without peel counter part and were also higher than the with peel samples of bottle gourd. With peel samples of both the vegetables had higher amount of non-reducing sugars.

Chayote contained higher amount of crude fiber as compared to bottle gourd (Table 1). Fiber content was more in the with peel samples of both the vegetables. Significantly higher neutral detergent fiber and acid detergent fiber were found in the with peel samples of chayote as compared to its without peel counter parts reason that peel of chayote is thicker as compared to bottle gourd. Other dietary fiber constituents like hemicellulose, cellulose and lignin were significantly higher in chayote when compared with bottle gourd. Lignin content was maximum in the without peel samples of chayote (0.267 gm/100 gm) and minimum in the without peel samples of bottle gourd. Higher amount of starch and

sugars in without peel samples of bottle gourd and chayote can be due to reason that with peel samples contained more unavailable carbohydrates i.e. fiber and dietary fiber constituents whereas flesh portion contained more of starch, and sugars. Higher crude fiber in chayote results in more of dietary fiber constituents. This can also be due to reason that peel of chayote is thicker as compared to bottle gourd.

Data in Table 2 shows the calcium, iron, phosphorus, potassium, zinc, magnesium, copper, sodium and magnesium, content of with peel and without peel samples of chayote and bottle gourd. As is clear from the data significantly ($P < 0.05$) higher mineral content was there in the with peel samples of chayote as compared to its without peel samples and bottle gourd, except, potassium, copper, sodium and magnesium which was more in the without peel samples of the both vegetables. Higher amount of calcium, iron phosphorus, zinc and magnesium was there in with peel samples of chayote and bottle gourd which might have been due to the reason that peel is rich in the

mineral and peeling off peel resulted in a decrease in the mineral content. About ten times more calcium is there in the chayote as compared to bottle gourd.

CONCLUSION

More sugars starch crude fiber and mineral are there in chayote as compared to bottle gourd despite the fact that both vegetables belongs to same family of vegetables. Chayote is very rich in calcium as compared to bottle gourd. Further studies are needed in this regards.

KEYWORDS Chayote. Bottle Gourd. Crude Fiber. Total Sugar. Non Reducing Sugars. Legnin.

ABSTRACT With peel and without peel samples of two vegetable viz. Chayote (*Sechium edule*) and bottle (*Lagenaria siceraria*) ground both belonging to the family cucurbitaceae were analysed for their carbohydrate content viz. crude fiber reducing sugars, non reducing sugars and different dietary fiber constituents like, NDF, ADF, legnin cellulose and hemicelluloses and mineral's like calcium, phosphorus and iron content and minerals. Chayote was found to be better in dietary fiber constituents, who are

significantly higher when compared with bottle gourd, but total sugar, reducing sugars and non reducing sugars were significantly less in chayote.

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