

Short communication

**VITAMIN C CONTENT IN TROPICAL FRUITS AND VEGETABLES
AVAILABLE IN DIFFERENT DISTRICTS OF BANGLADESH**

SHAMEEM ARA BEGUM, M. MAZEDUL HOSAIN, M. FAIAZ AHMED, M. A. MUTTAKIN, AND MD. MIZANUR RAHMAN*.

Department of Chemistry, Shah Jalal University of Science & Technology, Sylhet – 3114, Bangladesh.

(Received revised copy: August 2, 2009)

A wide variety of food exists that contains vitamin C. Tropical Bangladesh is rich in fruits and vegetables. Fruits and vegetables are rich sources of vitamin C and importance of these in human diet is universally recognised. Vitamin C content of some fruits and vegetables available in Bangladesh was reported Biswas et al.¹ Recently we reported the vitamin C content of some fruits and vegetables available at Sylhet area in Bangladesh.^{2,3} There are many vegetables and fruits available at different district of Bangladesh. In our continuous study on the vitamin C content, we collected varieties of vegetables and fruits from different regions specially Chittagong, Comilla & Sylhet and estimated the amount of vitamin C in such samples.

The content of vitamin C in fruits and vegetables found in Chittagong and Comilla may be different because the properties of soil and climate of this region is different. Therefore, a comparative study of vitamin C content of selected fruits and vegetables at Sylhet and Comilla districts were also considered. Here a well established chemical method (2,4-dinitrophenyl hydrazine methods -DNPH)⁴ was used as a simplified method for the simultaneous determination of the total vitamin C.

Fruits such as orange, lemon etc contain high amount of vitamin C and vegetables such as Cabbage, Green pepper, Red pepper also have relatively high amount (7mg/100g to 163mg/100g) vitamin C.⁵ In our study the samples were procured from Chittagong, Comilla and Sylhet and ascorbic acid content of these samples such as Gaab, Kacha Bel, Thankonipata, Metosh etc were determined. The content of vitamin C varied in fruits from 6.2 mg/100g to 495 mg/100 g and in vegetables 12 mg/100g to 70 mg/100g. The results are summarized in table 1.

* Corresponding author: Department of Chemistry, Shahjalal University of Science & Technology, Sylhet-3114, Bangladesh. e-mail: mizan_sust@yahoo.com

Table 1.
The total vitamin c content in vegetables and fruits

Entry	Local Name	Botanical name	% of edible part	Condition	Total vitamin-C (mg/100g)	Percent of standard deviation(%S)
1	Ghema shak	<i>Hydrocotyle rotundifolia Roxb</i>	98	fresh	14.36±0.023	0.16
2	Pat Shak	<i>Corchorus capsularis</i>	85	fresh	24.469±0.244	0.997
3	Almise shak	-	98	fresh	29.61±0.075	0.25
4	Metosh (fruit)	-	40	fresh	54.474±0.411	0.754
5	Tetire dug shak	-	98	fresh	18.71±0.043	0.23
6	Shalgom	<i>Brassica Campestris ver.turnip</i>	80	fresh	18.963±0.199	1.049
7	Donkolosh	-	80	fresh	38.463±0.234	0.608
8	Nuinna shak	-	95	fresh	13.853±0.217	1.566
9	Kharashim	-	90	fresh	34.39±0.109	0.319
10	Thankunipata	<i>Centella asiatica</i>	95	fresh	13.286±0.236	1.780
11	Kattosh shak	-	95	fresh	12.902±0.07	0.548
12	Titbegun	<i>Solanum anguivi</i>	97	fresh	17.481±0.619	3.543
13	Puibichi	<i>Besella rubra</i>	97	fresh	45.298±0.909	2.008
14	Dhainna morich	<i>Capsicum spp</i>	98		24.52±0.229	0.934
15	Dhekishak	<i>Pteris spp</i>	95	fresh	14.439±0.112	0.777
16	Shial mutri shak	<i>Vernonia patula</i>	90	fresh	17.853±0.246	1.377
17	Banglakola	<i>Musa spp.</i>	90	fresh	104.11±0.963	0.925
18	Kacha-bel	<i>Aegle marmelos</i>	73	fresh	495.03±0.1.15	0.233
19	Kath-badam	<i>Terminalia catappa</i>	30	fresh	20.207±0.261	1.291
20	Arolshem	<i>Cojanus cajan Linn</i>	65	fresh	28.34±0.037	0.130
21	Lutkey	<i>Melastoma malaba thricum Linn</i>	75	fresh	237.52±0.023	0.010
22	Kache tal	<i>Borassus flabellifer Linn</i>	45	fresh	6.20±0.043	0.700
23	Vate ()	<i>Nymphaea nouchali</i>	75	fresh	37.11±0.049	0.132
24	Gaab	<i>Diopyres peregrina Linn</i>	70	fresh	229.27±0.023	0.010
25	Hingry	<i>Castannopsis tribuloides</i>	85	fresh	13.469±0.025	0.185

Effect of cooking and influence of storage time on vitamin C content of selected vegetable were analysed. The initial concentration of ascorbic acid was 37mg/100g in fresh vegetables and decreased by 82% during storage time at 5 °C and 53% at -10 °C. The effect of cooking and preservation are shown in table 2.

Table 2.
Effect of preservation and cooking of mattos shak at different conditions

Local Name	Botanical name	% of edible part	Condition	Temperature (°C)	Day	Total vitamin-C (mg/100g)	Percent of standard deviation (%S)	
Mattos shak	<i>Chorchorus aestuans</i> Linn	95	Fresh			37.82±0.380	1.010	
			Preservation	5 °C	7	31.03±0.025	0.080	
					15	26.53±0.091	0.340	
					21	21.72±0.150	0.700	
					30	19.38±0.640	3.300	
					37	16.01±0.075	4.600	
					45	13.22±0.070	0.520	
					52	10.5±0.050	0.400	
					60	6.90±0.400	5.700	
					-10°C	7	34.01±0.052	0.150
						15	31.86±0.190	0.590
						21	30.22±0.395	1.300
						30	28.49±0.280	0.98
						37	26.285±0.090	0.390
						45	23.61±0.700	2.960
			Heat effect	Boil (in 80ml water for 20min)	40°C	22.011±0.050	0.227	
					60°C	15.560±0.230	1.478	
					80°C	7.290±0.090	1.234	
					Fry (With soybean oil 1-table spoon)	10min	12.731±0.242	1.901
						20min	6.280±0.310	4.936
30min	3.871±0.021	0.542						

Vitamin C is the most important vitamin for human nutrition that is supplied by fruits and vegetables. The 2, 4-Dinitrophenyl hydrazine method is very simple and direct method for determination of vitamin C. The locally available citrous fruits and leafy green vegetables are important source of vitamin C. From the samples of fruits analysed for this work levels of vitamin C 6.2 mg/100g to 495 mg/100g were found in fruits and the content of vitamin C 12 mg/100g to 70 mg/100g were found in vegetables.

ACKNOWLEDGEMENTS

We are grateful to the Department of Chemistry, Shah Jalal University of Science & Technology, Sylhet-3114, Bangladesh for giving necessary facilities during research.

REFERENCES

1. S. K. BISWAS AND M. A. MANNAN; Determination of vitamin C (ascorbic acid) in some fruits and vegetables *B. J. Sci. & Ind. Res.* **1**, xxxi, 1996.
2. M. M. RAHMAN , M. M. RAHMAN KHAN, A. T. M. Murad and S. A. Begum; *Bangladesh J. Environ. Sci.*, **11**(1), 190-193, 2005.
3. M. M. RAHMAN et. al. *J. of Biological Sciences* **6**(2), 388-392, 2006.
4. R. RIEMSCHEIDER., M. Z. ABEDIN AND R. P. *Alimenta.* **15**, 171, 1976.
5. LIDIJA B. PFENDT, VESNA L.VUKASINOVIC, NADA Z. BLAGOJEVIC AND MIRJANA P. RADOJEVIC *Eur. Food Res Technol*, **217**, 269-272, 2003.