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STUDY OF VITAMINS IN SELECTED SEAWEEDS OF KARACHI COAST

MAHBOOB A. KALHORO AND J.N. USMANI PCSIR Laboratories Complex, Karachi-39, Pakistan

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Eight different species of seaweeds belonging to Rhodophytes and Phaeophytes family - Tetra sporangia (Padina), Botryocladia microphysa, Carpogonia florideae, Dictoyota dichotoma, Iyengaria stellata, Samia indica, Hypnea musciformis and Sargassum vulgare were studied for their contents of vitamins.

Keywords: Vitamins, Seaweeds

Introduction

Most edible seaweeds contain amino acids, carbohydrates, fats, proteins, vitamins, trace elements and an appreciable amount of iodine[1]. Seaweeds synthesize and accumulate vitamins for their growth and development. Different species of seaweeds require varying amount of vitamins according to season and their environments.

The variability in vitamin requirements of isolets of the same species was first noted by Lewin and Lewin [2]. However, variation in vitamin B_1 content may sometimes be due to non-biological destruction of thiamine, as demonstrated by Gold *et.al.* [3]. Several green, brown and red seaweeds are particularly appreciated as a human food [4].

While the nutritional value of seaweeds lies at present primarily in their vitamins [5], proteins and mineral contents, future technical innovations might permit a better utilization of the world's seaweeds resources for human nutrition [6].

Hart *et. al.* [7,8] carried out work of similar nature on the basis of seaweeds potential for consumption, which promoted us to investigate the presence of vitamins in seaweeds available on Karachi coasts.

Materials and Methods

To carry out the estimation of vitamins in eight different species belonging to Phaeophytes and Rhodophytes family in the subtidal region, these were collected in December 1987, from the Manora sea side at Karachi. All the fresh samples were thoroughly washed with tap water then washed again with distilled water and stored at 4° . All species were extracted with distilled water, alcohol and pet. ether after one week.

For the analysis of vitamins USP (United State Pharmacoepia) and BP (British Pharmacoepia) procedures were followed. For vitamin B_1 , nicotinamide, folic acid, vitamin K and cynocobalamine (vitamin B_{12}) USP was followed whereas for vitamin A, vitamin B_2 , vitamin B_6 and vitamin C (B.P) was used.

Extracts were analyzed with photic-100 spectrophotometer (Erma Co., Tokyo) against a standard

solution and the following wavelengths as indicated: vitamin B_1 , 370nm; nicotinamide, 450nm; vitamin B_6 , 650nm; vitamin B_2 , 445nm; vitamin K, 380nm; vitamin A, 360nm; folic acid, 361nm. Vitamin C was titrated against the M/100 iodine solution (Table 1) whereas vitamin B_{12} (cynocobalamine) were tested as a microbiological assay against the standard solution (which has strength of 0.01ppm) (Fig 1). The aqueous extracts of seaweeds were taken at 80° for 30 minutes.

For the microbiological assay [9], all the eight samples were plotted against the time period alongwith standard solution, shown in Fig. 1 which helped to calculate the value





of vitamin B₁₂. All The values are calculated in parts per million for these vitamins as given in Table 1 and Fig. 1. **Results and Discussions**

The Table 1 and Fig.1 shows that all the samples were high in vitamin C followed by vitamin B_2 with the exception

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Sr. No.	Name of species	Vitamın A (ppm)	Vitamin B ₁ (ppm)	Vitamin B ₂ (ppm)	Vitamin B ₆ (ppm)	Vitamin B ₁₂ (ppm)	Vitamin C (ppm)	Folic acid (ppm)	Vitamin K (ppm)	Nicoti- neamide (ppm)
1	Tetra sporangia (Padina) (P)	12.52	24.73	665.32	33.43	0.005	21042.52	134.18	8.32	135.39
2	Botryocladia microphysa (R)	10.53	13.01	1887.77	111.79	0.020	6381.88	30.97	Traces	192.07
3	Carpogonia florideae (R)	10.64	106.67	1857.59	413.33	0.008	3070.11	96.68	Traces	15.0
4	Dictyota dichotoma(P) 17.27	42.67	619.19	203.33	0.005	3698.09	202.42	9.22	39.0
5	Iyengaria stellata(P)	19.43	140.0	386.99	41.67	0.0128	1962.43	41.44	5.37	468.75
6	Samia indica (R)	14.39	11.56	Traces	19.44	0.005	5669.24	62.94	4.65	125.0
7	Hypnea musciformis(I	R) 47.97	88.89	773.99	277.78	0.015	8334.26	25.18	7.16	Traces
8	Sargassum vulgare(P	78.23	Traces	1682.59	120.77	0.008	5056.17	87.57	17.21	7.5

TABLE 1.

Table shows the values of different vitamins (in ppm) in the various species of Seaweeds. The P means Phaeophytes and R for Rhodophytes family.

of Samia indica, where vitamin B_2 was found to be in traces. Trace amounts of vitamin B_1 and nicotinamide occurred in S. vulgare and Hypnea musciformis respectively. Maximum values for vitamin A occurred in S. vulgare, vitamin B_1 in Iyengaria stellata, vitamin B_2 in Botryocladia microphysa, vitamin B_6 in Carpogonia florideae, vitamin K in S. vulgare, Folic acid in Padina, nicotinamide in Iyengaria tellata, vitamin C in Hypnea musciformis and vitamin B_{12} in Botryocladia microphysa and Hypnea musciformis, whereas lowest value of Cynocobalamine is in Tetrasporangia (Padina), Dictyota dichotama and Samia indica.

It is evident that the above collected data for the study of vitamins in seaweeds has been reported for the first time in Pakistan.

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Each of these parameters which has direct effect on energy conservation will be further discussed in detail. Attention is mainly focussed on the dryers evaporating water, because this is by far the most common case and consume major portion of energy in the industrial dryers.

(a) Better operating conditions. The following points are considered as good operating practice, but are surprisingly neglected quite often by the production ericated personnel. If a little care is taken, considerable amount of energy could be gaved. J.C. Lewin, and R.A. Lewin, Can. J. Microbiol., 6, 127-134 (1960).

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