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BIOCHEMICAL STUDIES OF SOME SEAWEED SPECIES FROM KARACHI COAST

PARVEEN AKHTAR AND VIQAR SULTANA

Zoological Survey Department, Government of Pakistan, Karachi (PA); Department of Biochemistry, University of Karachi (VS).

ABSTRACT: - The present study deals with biochemical composition of 10 seaweed species; one belonging to chlorophyceae and nine to phaeophyceae. The results revealed that all these ten seaweed species had high nutritive value because of high content of carbohydrate 24.5-55.5% in brown seaweed and 32.9% in green seaweed. Mineral contents were 5.6 - 40.2% in brown species and 18.6% in green species. Less amount of lipid (3-6.5%) in brown seaweed was found, as compared to in green seaweed (9.8%).

KEY WORDS: Seaweed, Nutritive value.

INTRODUCTION:

Ocean and seas cover 71% of the earth's surface and constitute the single largest reservoir of life on the earth. Amongst marine natural product "seaweed" represent an under-explored source of new natural products with potential applications. Many workers have tried to exploite seaweed as unconventional source of supplementary diet for human being and animal consumption and source of fertilizer (Levering *et al*, 1969; Chapman, 1980 and Alam & Qasim, 1994). More than 100 species, mostly of phaeophyceae and chlorophyceae are used as food in different parts of the world especially in Japan, China, Sri Lanka, and Thailand etc. Algae are important as the chief source of food and oxygen to all marine and fresh water animals.. Recent researches on chlorophyceae have revealed that it can be served as an efficient source of food for man as it contains high percentage of proteins and all the vitamins from A to D. As seaweed are rich in carbohydrate, protein, and lipid content and due to appreciable amount of certain important essential amino acids, fatty acids and minerals, seaweed could be used as an alternative food (Chapman & Chapman, 1980; Qasim, 1991). The present study has been carried out to investigate the biochemical components of seaweed which could be used as a source of food materials.

MATERIALS & METHODS:

Seaweed species were collected from Buleji and Paradise point, Karachi in different seasons at low tide. Different species of seaweed exposed on sands and rocks were collected, washed under tap water and dried under shade. These seaweed were then powdered in an electrical millar and stored in polyethylene bags until used. The biochemical contents such as water, carbohydrate, ash, protein and lipid were estimated by using standard methods. Water content was determined by standard method of AOAC, $_{o}$(1980). Ash content of seaweed species was determined by ashing the sample at 550 °C for 8 hours (AOAC, 1960). Total carbohydrate content was determined by Dubois, *et* a/.,(1956) method. The protein content in the sample was estimated by standard Lowery *et al,* (1951) method. Total lipid was determined by method as described by Folch *et al,* (1957).

RESULT & DISCUSSION:

Ten seaweed species belonging to chlorophyceae and phaeophyceae were collected from Buleji & Paradise point and identified (Table-I).

TABLE -1. Seaweed Collected from Karachi Coast

S. No.	Name of Seaweed	Locality
1. (i).	Green *Caulerpa racemosa (Forsk.) J. Ag.*	Buleji
2. (i).	Brown *Colpomenia sinuosa (Roth.) Derb et Sol.*	Buleji
(ii).	*lyengaria stellata (Borg.) Borg*	Buleji
(iii).	*Padina pavonia (L) Lamour*	Paradise Point
(iv).	*Sargassum binderi*	Buleji
(v).	*S. swartzii (Turn.) C. Ag.*	Buleji
(vi).	*S. tenerrimum J. Ag.*	Buleji
(vii).	*Spatoglassum variable Fig. Et De Notar*	Paradise Point
(viii).	*Stoechospermum marginatum (C. Ag.) Kutz*	Buleji
(ix).	*Stokeyia indicia Thivy et Doshi*	Buleji

The constituents were calculated as percentage dry weight of seaweed. The proximate composition of this investigation is given in Table -II.

TABLE -II Biochemical Composition of Seaweeds

No.	Name of Seaweeds	Water %	Ash %	Protein %	Lipid %	Carbohydrate %
1.	Green					
(i). 2.	*Caulerpa racemosa (Forsk) J. Ag.*	87.7+1.1	18.6 ±0.9	18.4±2.4	9.8 + 2.5	32.9 ±0.5
(i).	Brown					
	Colpomenia sinuosa (Roth.) Derb et Sc	*I* 89.9±1.3	13.7 ±0.4	05.1 ± 1.8	03. +1.3	49.1 + 0.4
(ii).	*lyengaria stellata (Borg) Borg.*	88.5 ± 0.7	19.8 ±0.2	07.3 ± 1.7	04.4 + 2.8	38.2 ±0.9
(iii).	*Padina pavonia (L) Lamour*	79.4 ± 0.5	07.5 ±0.1	06.7 ± 0.9	05.1 + 1.8	32+5.6
(iv).	*Sargassum binderi*	88.2 ±0.4	05.6 ±0.2	08.7 ± 2.3	4.5 + 0.4	32 ±0.3
(v).	*S. swiirtzii (Turn.) C. Ag.*	85.6+0.7	40.2 ±1.3	07.5 ± 5.6	03.5 ±0.2	24.8 ±0.4
(vi).	*S. tenerrimum J. Ag.*	86.7 ±0.7	07.7 +o;2	07.0 ± 0.9	04.7±1.6	28.3 ±0i6
(vii)	*S. variable fig. Et. De Notar*	80.8 ±0.2	35.+1.6	06.8 + 0.2	06.5 ± 0.2	39.5 ± 0.6
(viii)	*Stoechospermum marginatum* (C.Ag) Kutz.	91.7+1.2	29.6±0.7	05.3 ± 1.6	05.7 ±0.1	24.5 ±1.8
(ix).	*Stokeyia indicia* Thivy et Doshi	82.3 + 2.3	18.2+2.6	14.2 ± 0.9	03.5 + 0.7	55.5 ±1.9

Values are means + SD, with n=4.

Caulerpa racemosa (green) was found to contain 87.7% of water. Water content in brown seaweed ranged from 79.4-91.7%. Results revealed that water was major constituent of all the seaweed examined. The ash value of *C. racemosa* was 18.6%. Significant variation in ash content (5.6-40.2%) has been observed in brown seaweed. Lowest value was obtained for *Sargassum binderi* and highest for *S. swartzii*. Another major component of these seaweed species was found to be carbohydrate. *C. racemosa* (green) contained 32.9% and it significantly varied from 24.5-55.5% in brown species. The carbohydrate of seaweed are resistant to the action of digestive enzymes and their nutritive value is very low but polysaccharides of algae have great importance in the treatment of many diseases *e.g.* hypoglycemia and tumor (Lamela *et. al.*, 1989 and Takashi, *et. al.* 1995). The protein content was estimated higher in *C. racemosa* (18.4%) and it varied from 5.1-14.2% in brown seaweed. It was found highest in *stokeyia indicia* and lowest in *Colpomenia sinousa.* The amount of protein content in seaweed is higher than other food materials such as cereals, eggs and some other food materials (Katheresan, 1992). The lipid composition of *C. racemosa* was 9.8% whereas in brown seaweed, it varied from 3-6.5% Lowest value was observed in *C. sinuosa* and highest in *Spatoglassum variabile* (Table II).

It has been concluded that these seaweed species contain vital components which are required-for physiological process of human and animal nutrition. Seaweed are rich in carbohydrate, protein, lipid and minerals and do not cause any disorder of lungs, kidneys, stomach and intestine (Katheresan, 1992). So they could be used as a potential source of food.

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