

Biochemical Composition of *Ulva rigida*

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ABSTRACT

From the ancient times, Seaweeds are an important source for food, fodder, fertilizer and medicine. Biochemical composition of the green alga *Ulva rigida* (member of *Ulvophyceae*) was investigated by determination of protein, carbohydrate, total lipid, chlorophyll a, chlorophyll b and total carotene content. The protein content of the alga was 7.5 % whereas carbohydrate content was 5.1 % and 4.32 % total lipid was recorded. The total carotene content was 2.36 µg/gm whereas chlorophyll a and chlorophyll b were determined as 14.26 µg/gm and 9.86 µg/gm respectively. It was found that major of the biochemical parameters of this alga were higher and hence this alga can be considering as good food supplement.

Key words: Biochemical composition, Carbohydrate, Lipid, Protein, Seaweed

1. Introduction

According to the United Nations States, the world population will reach 9.8 billion in 2050 and, by that time, fish and seafood will be one of the most-sought food resources [1]. From the ancient times, many countries are using seaweeds as source of food, fodder fertilizer and medicine. Seaweeds are useful for industry also. Seaweeds are the raw material for many industrial productions like agar-agar, alginate derivatives and carrageenan but they continue to be widely consumed as food in Asian countries [2]. Macroalgae are nutritionally rich, it can be use as fresh or dried vegetables, salads, or as ingredients in a wide variety of prepared foods [2]. According to Norziah *et al*, 2002 Certain edible seaweeds contain significant quantities of protein, lipids, minerals and vitamins [2]. Nutrient content of seaweeds can be varied with species. Even same species also shows different content due to factor like geographical location, season, humidity and temperature.

Marine algae are an important source of dissolved organic carbon in coastal waters. Carbohydrates, polysaccharides, nitrogenous and polyphenolic materials, represent the organic carbon [1]. Considering its utility many researcher worked on this alga and reported amino acid composition, lipid composition, The amino acids of algae have a wide application in human and animal feed nutrition industries [2].

Around 10% of the green algae are marine in habitat and mostly found in tropics. They are direct source of food, fertilizer, medicine and fodder. Among the various species of green algae *Ulva* and *Enteromorpha* are used for human consumption in Japan, East Asia, West and South-East Asia, North and South America and Oceania. Other species of green algae are also found their application as human food and medicine [2].

Considering the commercial importance of this alga, the biochemical composition was analysed and the results obtained on this aspect are presented in this paper. Considering the importance of seaweeds, it can be said that, sea weeds can play a vital role in various aspects.

2. Materials and Methods

2.1 Materials: The raw material employed in the experiments of *Ulva rigida* collected from Vivekananda Rock monument from Kanyakumari, India (Coordinates 8°04'41.1"N and 77°33'19.7"E). Cell biomass was harvested by centrifugation and the pellet washed with 0.9% ammonium formate in order to partially desalt the sample and, after repeated centrifugation, the pellet was dried in shed [3].

2.2 Biochemical analysis

2.2.1 Chlorophyll a, Chlorophyll-b, total carotenoid

Pigment quantification was measured by spectrophotometrical method [4]

2.2.2 Protein Estimation

Estimation of protein in algae was carried out by Bradford method [5]

2.2.3. Estimation of Carbohydrate

Estimation of protein in algae was done by Anthrone method [5]

2.2.4 Lipid Estimation

Estimation of oil in algae was done by Oil estimation method [5,6]

3. Result

Table I: Shows Chlorophyll a, Chlorophyll b, Total carotenoid content of *Ulva rigida*

Name of algal material	Chlorophyll a content (ug/gm fw)	Chlorophyll b content (ug/gm fw)	Total Carotenoids content (ug/gm fw)
<i>Ulva rigida</i>	14.26	9.86	2.36

(*fw - for wet basis)

Table II: Shows Carbohydrate, Protein, and Lipid content of *Ulva rigida*

Name of algal material	Total Carbohydrate contain (%/gm)	Protein (%/gm of dry mass)	Lipid (% / gm of dry mass)
<i>Ulva rigida</i>	5.1 %	7.5 %	4.32 %

4. Discussion

Ulva rigida show 7.5 % Protein content , carbohydrate content 5.1 % and 4.32 % total lipid . The total carotene content was 2.36 ug/gm whereas chlorophyll a and chlorophyll b were determined as 14.26 µg/gm and 9.86 µg/gm respectively. Similar work done by Gour G. S. et al (2011). We reported high protein than Gour G.S. et al (2011) reported in *Ulva rigida*. Gaur G.S. et al (2011) mentioned higher content of lipid and carbohydrates as compared to our finding[1]. Further more study is needed for the use of carbohydrate, protein, lipid and amino acid as a source of food and energy for humans and animals.

5. Conclusion

Ulva rigida can be used as food supplement due to its high protein content. From the studies undertaken, it can be concluded that due to rich in protein, lipid and carbohydrates can be used as food and feed. lipid content shows that it can be used for biodiesel production.

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