

BIOCHEMICAL COMPOSITION OF SOME GREEN ALGAE FROM MANDAPAM COAST

Reeta Jayasankar, J.R. Ramalingam and N. Kaliaperumal

Regional Centre of Central Marine Fisheries Research Institute,
Mandapam Camp - 623 520, India

Abstract

Twenty three species of green algae belonging to twelve genera collected from Mandapam coast were analysed for protein, carbohydrate and lipid. The protein content varied from 5.06% (Codium tomentosum) to 20.93% (Microdictyon agardhianum). The carbohydrate content varied from 16.0% (Ulva lactuca) to 56.25% in (Caulerpa laetevirens). The lipid content ranged from 6.99% (Caulerpa sertularioides) to 15.70% (Cladophora fascicularis).

Introduction

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 such as Codium, Chaetomorpha and Caulerpa also find their application as human food and medicine in certain regions (Johnston, 1966; Neish, 1976; Saito, 1976 and Chapman, 1970). Considering the commercial importance of these algae, the biochemical composition of certain commonly occurring green algae of Mandapam coast were analysed and the results obtained on this aspect are presented in this paper.

Material and Methods

Twenty three species of green algae belonging to twelve genera were collected from Mandapam coast (Palk Bay and Gulf of Mannar) in the month of January and February 1989. They were cleaned thoroughly in fresh water followed by distilled water, dried in oven at 60-70°C, pulverised and sieved. The dried powder was taken for estimation of protein, carbohydrate and lipid.

The protein content was analysed by the revised method of Lowry et al. (Hartree, 1972). The carbohydrate content was analysed by phenol-sulphuric acid method of Dubois et al., (1956). The lipid was extracted by the method suggested by Folch et al. (1957) and estimated by sulphosphovanillin method (Barnes et al., 1973). All these values were expressed as percentage of dry weight.

TABLE 1. Percentage of protein, carbohydrate and lipid (dry weight basis) of green algae from Mandapam coast.

Sl. No.	Name of the alga	Protein	Carbohydrate	Lipid
1.	<u>Ulva lactuca</u> Linnaeus	8.78	16.00	7.37
2.	<u>U. reticulata</u> Forsskal	12.83	16.88	8.57
3.	<u>Enteromorpha compressa</u> (Linn.) Grev.	7.26	24.75	11.40
4.	<u>Chaetomorpha aerea</u> (Dillw.) Kuetz.	10.13	31.50	8.57
5.	<u>C. antennina</u> (Bory) Kuetz.	10.13	27.00	11.49
6.	<u>C. linoides</u> (Ag.) Kuetz.	9.45	27.00	12.08
7.	<u>Cladophora fascicularis</u> (Mertens) Kuetz.	15.53	49.50	15.70
8.	<u>Microdictyon agardhianum</u> Decsne	20.93	27.00	9.43
9.	<u>Boergesenia forbesii</u> (Harv.) Feldm.	7.43	21.38	11.42
10.	<u>Valoniopsis pachynema</u> (Martens) Boergs.	8.78	31.50	9.09
11.	<u>Dictyosphaeria cavernosa</u> (Forssk.) Boergs.	6.08	42.75	10.51
12.	<u>Bryopsis plumosa</u> (Huds.) Ag.	9.45	27.00	9.00
13.	<u>Caulerpa chemnitzia</u> (Esper) Lamour.	11.82	32.63	11.42
14.	<u>C. cupressoides</u> (Vahl) Ag.	7.43	51.75	10.97
15.	<u>C. peltata</u> Lamour.	6.41	45.00	11.42
16.	<u>C. laetevirens</u> Mont.	8.78	56.25	8.80
17.	<u>C. racemosa</u> var. <u>macrophysa</u> (Kuetz.) Taylor	8.78	33.75	10.63
18.	<u>C. fergusonii</u> Murr.	7.76	23.63	7.15
19.	<u>C. sertularioides</u> (Gmel.) Howe	9.11	49.50	6.99
20.	<u>Halimeda macroloba</u> Decaisne	5.40	32.63	9.09
21.	<u>Codium adhaerens</u> Anderson	7.26	40.50	7.40
22.	<u>C. decorticatum</u> (Woodw.) Harvey	6.08	50.63	9.00
23.	<u>C. tomentosum</u> (Huds.) Stackhouse	5.06	29.25	7.15

Results and Discussion

The data obtained on protein, carbohydrate and lipid contents of green algae analysed are given in Table 1. The protein varied from 5.06% in Codium tomentosum to 20.93% in Microdictyon agardhianum. The carbohydrate varied from 16.0% in Ulva lactuca to 56.25% in Caulerpa laetevirens. The lipid ranged from a minimum of 6.99% in Caulerpa sertularioides to a maximum of 15.7% in Cladophora fascicularis.

The carbohydrate content was found to be more than protein and lipid in all the 23 species of green algae collected from Mandapam coast. The family Ulvaceae comprising two genera Ulva and Enteromorpha did not show much variation in lipid, protein and carbohydrate contents. The values for protein varied from 7.26% to 12.83%, carbohydrate from 16.60 to 24.75% and lipid from 7.37 to 11.4%. The carbohydrate content was least in these two genera compared with the other green algae taken for analysis. In the

family Cladophoraceae comprising two genera Cladophora and Chaetomorpha showed a considerable variation in the biochemical composition among them. In Chaetomorpha species there was not much variation in protein, lipid and carbohydrate contents. But Cladophora fascicularis showed more carbohydrate, protein and lipid when compared to the species of Chaetomorpha which is in conformity with the observation of Lewis (1967) that protein content is not related to taxonomic position of algae.

The genera Microdictyon, Valoniopsis, Boergesenia and Dictyosphaeria belonging to the family Valoniaceae showed almost similar trend in their biochemical composition except for high value of protein in Microdictyon agardhianum (20.93%) and carbohydrate in Dictyosphaeria cavernosa (42.75%). The different species of Caulerpa showed considerable variation in the bio-chemical composition. The protein content varied from 6.41 to 11.82%, carbohydrate content varied from 23.63 to 56.25% and lipid from 6.99 to 11.42%. The family Codiaceae comprising two genera Codium and Halimeda was having least amount of protein content and it varied from 5.06 to 7.26%.

Pillai (1957) while working on seasonal variation in the biochemical composition of eight species of algae from Mandapam coast, reported that protein content did not exceed 12.5%. This is in agreement with the result obtained in the present investigation except in the case of Cladophora fascicularis and Microdictyon agardhianum which contained 15.53% and 20.93% of protein respectively on dry weight basis. Parekh *et al.* (1977) observed considerable variation in the chemical composition of 27 species of green seaweeds from Saurashtra coast. Similarly the present study also showed variation in the biochemical composition in different genera of green algae.

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