Materials and methods

The investigation was carried out on November 2006 to August 2007 at Salimpur mangrove area. Bamboo poles were used for culture of *Catenella nipae*. A total area of 5 m x 5 m was selected. To culture *C. nipae* on bamboo poles, at first bamboo poles were collected and cut into 0.5m size length each. Within the culture area bamboo poles were installed maintaining 0.5 m distance between two consecutive poles. Then body segments of *C. nipae* from the nature were collected and were attached in the bamboo poles with the help of thread. Routine checked of the culture system was done. After three months culture experimental algal species was collected carefully with the help of a sharp knife and taken in to plastic bag. All the collected samples are stored in refrigerator for further analysis.

Introduction

Seaweeds are sedentary organisms, growing on the rocky or hard substratum of intertidal water of World Ocean. They belong to the group of plants known as algae containing some of the most primitive members of the plant kingdom. Okazaki stated, “Seaweeds as the name implies covers the macroscopic plant life of the sea except the flowering plants”. It has immense importance both for human and faunal communities. Prehistorically, people have been consuming seaweed either raw or cooked condition. Novaczek reported that seaweeds have large amount of protein, amino acids, lipids, vitamins and minerals, polysaccharides and dietary fibers. Some compounds of seaweeds control high blood pressure, level of cholesterol, and prevent strokes. These can also be used as remedy for rheumatism, diarrhea, and for controlling the growth of tumors. The culture of seaweed for human consumption is a relatively new enterprise. The concept about seaweed and its cultivation is limited to the scientific community, people hardly know about its importance and culture technique in developing countries. The status of seaweed cultivation in Bangladesh is still at the nascent stage. The study is first experiment of *Catenella nipae* culture on bamboo poles in the intertidal waters of Salimpur coast in Bangladesh where plenty of *C. nipae* grows naturally remains unutilized for long time. In addition, now-a-days utilization of algae as human food has been increasing in many countries like China, Japan, Philippines and Myanmar. Whereas the mass people of Bangladesh do not know that the algae can be used as human food. To grow interest on algae, knowledge on proximate composition and its nutritive value is essential. Hence, present investigation analyzed the proximate composition of algae *Catenella nipae*.

Results

Average moisture content was determined as 17.12±0.34%. Highest value was found 17.60 % during July 2007 and lowest value 16.87% was recorded during April 2007 (Table 1 & Figure 1). Mean ash content was determined as 5.38±0.23%. Highest value was found 5.71 % during January 2007 (Figure 1) and lowest value 5.20% was recorded during April 2007 (Table 1 & Figure 2). Mean protein content was determined as 1.32±0.07%. Highest value was found 1.39 % during January 2007 (Table 1 & Figure 3). Average crude fibre content was determined as 2.36±0.04%. Highest value was found 2.31% was recorded during April, 2007 (Table 1 & Figure 2). Mean carbohydrate content was determined as 11.50±0.05%. Highest value was found 11.57 % during January 2007 and lowest value 11.46% was recorded during July 2007 (Table 1 & Figure 2). Average crude fibre content was determined as 62.31±0.32%. Highest value was found 62.76 % during April 2007 and lowest value 62.07% was recorded during July 2007 (Table 1 & Figure 3).
Table 1 Proximate composition of *Catenella nipae* (January–July, 2007) on the basis of dry weight

| Month | % of Moisture | % of Ash | % of Fat | % of Protein | % of Crude fibre | % of Carbohydrate |
|-------|---------------|----------|----------|--------------|-----------------|------------------|
| January | 16.9 | 5.71 | 1.35 | 11.57 | 2.38 | 62.09 |
| April | 16.87 | 5.2 | 1.39 | 11.47 | 2.31 | 62.76 |
| July | 17.6 | 5.25 | 1.22 | 11.46 | 2.4 | 62.07 |
| Mean | 17.12 | 5.38 | 1.32 | 11.5 | 2.36 | 62.31 |
| SD | ±0.34 | ±0.23 | ±0.07 | ±0.05 | ±0.04 | ±0.32 |

Discussion

Chapman (1970) recommended proximate composition of seaweed varies with space and also depend upon the season of the year and the relative proportion of the different of the samples. The main proximate composition of seaweeds are moisture, ash (minerals), protein, fat, crude fibre and nitrogen free–extract. Hossain recorded the moisture, ash, protein, fat, crude fiber and carbohydrate ranged from (17.16–18.22%), (16.30–17.85%), (14.64–15.53%), (1.86–2.28%), (2.96–3.23%) and (43.76–45.98%) on dry wt. basis in *C. nipae* at Fauzdarhat mangrove area. Talukder recorded the moisture, ash, protein, lipid ranged from (1.02–1.70%), (3.63–6.99%), (11.10–15.33%), (1.07–2.80%), on wet wt. basis in *C. nipae* at Fauzdarhat mangrove area. Zafar recorded the protein, lipid, moisture, ash as 9.92%, 1.95 %, 84.56 %, 4.85%, on wet wt. basis of *Catenella nipae* at Fauzdarhat mangrove area. Novaczek & Zafar recommended that Caulerpa racemosa, Hypnea spp., Enteromorpha spp. and *Catenella nipae* are used for human dietary items for reducing high blood pressure, rheumatism, cholesterol level, growth of tumors and diarrhea. In the present work the proximate composition of *Catenella nipae*, shows the good nutrition value. The mean value of biochemical composition i.e.; moisture, ash, fat, protein, crude fibre and carbohydrate were estimated as 17.12±0.34%, 5.38±0.23%, 1.32±0.07%, 11.50±0.05%, 2.36±0.04% and 62.31±0.32% respectively on dry weight basis of *C. nipae*. So it may be used as human food and also use as a fish feed.

Conclusion

This study shows that *C. nipae* at Salimpur mangrove area possesses significant amount of nutritive value which can fulfill the nutritional requirement of the people of Bangladesh. No systematic study on this economic seaweed has done in Bangladesh before. Therefore, the present study can be the path–finder on the detailed study of specific seaweed for the enrichment of the study of phycology in Bangladesh.

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Conflict of interest

The author declares there is no conflict of interest.

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