



PROSPECTS OF SEaweEDS: A SEARCH ALONG SURATHKAL BEACH OF KARNATAKA

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ABSTRACT

Commercially available varieties of marine macro algae are commonly referred to as “seaweeds”. They are classified as red algae (Rhodophyta), brown algae (Phaeophyta) or green algae (Chlorophyta), based on the pigmentation and depending on their nutrient and chemical composition. Red and brown algae are mainly used as human food sources. For their various bioactivities, biomaterials derived from marine algae are important ingredients in many products, such as cosmetics and drugs for treating cancer and other diseases. Marine algae are rich in dietary fiber, minerals, lipids, proteins, omega-3 fatty acids, essential amino acids, polysaccharides, and vitamins A, B, C, and E. The study is the first comprehensive account of the floral biodiversity occurring along the Surathkal beach of coastal Karnataka. Occurrence of red seaweed *Gracilaria corticata* and green seaweed *Chaetomorpha antennina* (Bory) Kützting indicates the possibility of its farming in the estuary.

KEYWORDS: Seaweeds, floral biodiversity, estuary.

INTRODUCTION

Seaweeds are a marine group of simple plant-like organisms called algae. Seaweeds extracts are used in many everyday products, including foods, shampoos, cosmetics and medicines. Seaweeds are at the bottom of the marine food chain. They have the same role that plants do on Land, turning the sun’s energy into food whilst removing carbon dioxide from the air. Many animals rely on seaweeds for food and shelter. Seaweeds are similar in form with the higher vascular plants but the structure and function of the parts significantly differ from the higher plants.

Seaweeds do not have true roots, stem or leaves and whole body of the plant is called thallus that consists of the holdfast, stipe and blade. Seaweeds are traditionally consumed in the Orient as part of the daily diet. Currently, human consumption of green algae (5%), brown algae (66.5%) and red algae (33%) is high in Asia, mainly Japan, China and Korea (Dawes, 1998). According to Pereira and Costa-Lotuf, 2012, marine organisms are also prominent sources of new compounds with diverse biological activities, but when compared with plants; their use is much more restricted in traditional medicine. On the other hand, seaweeds and their extracts have attracted great interest in the pharmaceutical industry as a source of bioactive compounds.

Southgate (1990) has stated that consumption of seaweeds can increase the intake of dietary fiber and lower the occurrence of some chronic diseases (diabetes, obesity, heart diseases, cancers, etc.), which are associated with low fiber diets of the western countries. The seaweeds show great variation in the nutrient contents, which are related to several environmental factors as water temperature, salinity, light and nutrients.

There are well-documented bioactive metabolites of marine algae (Bhakuni *et al.*, 2005). Presently, interest in supplementing the human foods with antioxidants particularly from natural sources has been on the rise as synthetic antioxidants have been suspected to be a possible cause for liver damage and carcinogenesis (Tang *et al.*, 2001; Farag *et al.*, 2003). However, the nutrient compositions of seaweeds vary and they are affected by species, geographic area, season and temperature of water according to Jensen (1993).

MATERIALS AND METHODS

Study site

Surathkal is a suburb of Mangalore city in the Dakshina Kannada district, Karnataka state, India on the shore of Arabian sea. Karnataka state is situated between 11° 31' and 18° 45' N lat. and 74° 12' and 78° 40' E long and lies in the west-central part of the peninsular India (Figure 1).



Figure 1: Map showing Surathkal beach in Dakshina Kannada district, Karnataka, India.

Seaweeds were collected from the rocks of Surathkal beach (13 00'34.1" N lat. and 74 47' 16.1" E long.), Dakshina Kannada district, Karnataka.

Materials Required

For seaweed collection: Knife or scalpel, polyethylene bags, labeling materials (pen/pencil, labels, marker pens etc.) rubber bands, field note book, hand weight balance and a long rope (about 50 meters long).



Figure 2: Local fisherman at the sample collection site.

Local knowledge of marine algae was gathered mainly through individual interviews with fishermen (Figure 2). It was largely conducted in local language with the help of a local translator. The collection of seaweeds from the intertidal area is done during the low tide. It is necessary to go for collection one or two hours before the time of low tide as per tide tables. This will give more time for seaweed collection and to observe seaweeds in the natural habitat. It is important to make notes on the description of the site location, topography, associated flora and fauna and other related parameters.

Samples were washed with freshwater to remove adhering debris and dust particles. Specimens of the reported sea weeds were collected, dried, properly identified and authenticated with the reference by Dr. C. R. K Reddy, Central Salt and Marine Chemicals Research Institute, Bhavnagar. They were sorted out, identified and liquid specimens of all species were preserved.

RESULTS AND DISCUSSION

The present field analysis documents the following macro algae used along the coast of Surathkal Beach. The major macro algae are:

1. *Gracilaria corticata* (*J. agardh*): Source of hydrocolloids - source of agar (Figure 3).

Classification:

Empire: Eukaryota
Kingdom: Plantae
Subkingdom: Biliphyta
Phylum: Rhodophyta
Subphylum: Eurhodophytina
Class: Florideophyceae
Subclass: Rhodymeniophycidae
Order: Gracilariales
Family: Gracilariaceae
Genus: Gracilaria

2. *Chaetomorpha antennina* (*Bory*) *Kützing* – Direct use as food - food, consumed whole (Figure 4).

Classification:

Empire: Eukaryota
Kingdom: Plantae
Subkingdom: Viridiplantae
Infra kingdom: Chlorophyta infra kingdom
Phylum: Chlorophyta
Subphylum: Chlorophytina
Class: Ulvophyceae
Order: Cladophorales
Family: Cladophoraceae
Genus: Chaetomorpha



Fig 3

Fig 4

Figure 3: *Gracilaria corticata* (*J. agardh*) *Kützing* Figure 4: *Chaetomorpha antennina*

Distribution of marine algae in the littoral zone of the entire Karnataka coast was first studied in detail by Agadi (1985). Pioneering study on the phytoplankton of Karnataka coast was made by Subrahmanyam (1959). Untawale *et*

al., (1983) had observed 624 species of marine algae belonging to 215 genera and 64 families in India. Of these, nearly 60 species are commercially important. A total of 78 species of seaweeds were observed along the Karnataka coast belonging to 52 genera and 28 families.

According to Oza and Zaidi (2001), there is a revised check list of marine algae; 844 species were reported from India. Studies on the bioactivities of marine algae have revealed numerous health-promoting effects, including anti-oxidative, anti-inflammatory, antimicrobial, and anti-cancer effects. Seaweeds have been documented to contain many phytochemicals such as antioxidants and microbicidal molecules such as polyphenols, protein, amino acids and polysaccharides, carrageenans and alginate can function as antibiotics, laxatives, anticoagulants, anti-tumor, anti-ulcer products and suspending agents in radiological preparations and have been used for centuries in therapy and pharmacy. Karolina *et al.* (2009) investigated the phytoplankton assemblages in relation to hydrographic factors from the area near the old port in Mangalore.



Take care

Do the survey with a friend who can help if things go wrong and take a mobile phone with you (but be aware that in remote places there may not be network). It is necessary to check tide tables. It is safest to visit the seashore when the tide is falling. Make sure you don't get cut off by the tide and avoid crossing between rocks. Rocks may be slippery and sharp. Wear suitable footwear. If you touch the seaweeds, make sure you wash your hands before eating.

CONCLUSION

Seaweeds have been used since ancient times as food, fodder, fertilizer and as a source of medicine. Today seaweeds are the raw material for many industrial productions like agar, algin and carrageenan but they continue to be widely consumed as food in Asian countries. Seaweeds have immense application in pharmaceuticals, cosmetics and nutritional supplements. Food preparations of the seaweeds may be in the form of salad, vegetables for viand, dessert or pickles. They are locally used as medicine, fertilizer and insect repellent. There should be encouragement for development of other possible food products from seaweeds. Based on this the presence of potential species of Karnataka, there is a need for various research to develop food products as a social aspect.

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