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Editorial

Therapeutic Potential of Seaweed Bioactive Compounds

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Life began in the ocean and seas, especially in wealthy biodiversity and spreads over 70% of the World's surface. Marine resources are governed through an inestimable and considerable conservation demand which is just another variety of exploit. Obviously, recreational activities like fishing, marine tourism, mining and wide range of industrial applications are depending upon the resource of marine algae. Marine ecosystem encompasses flora and fauna, bacteria and higher plants that are utilized for natural antioxidants production by pharmaceutical industries in order to replace the usage of synthetic antioxidants. Thus, the presence of bioactive compounds in marine algae led the medical and biochemical research for human beings.

In general, algae are classified into four categories such as bacteria, plantae, chromista and protozoa at present. These four types vary in morphology and size, which ranges from unicellular to multicellular microalgae or colony forming marine organisms such as macrophytes and seaweeds. Traditionally, macroalgae are categorized according to their characteristic forms and sizes, however the most commonly used feature in algal classification is based on the presence of pigments. The huge number of bioactive compounds may possess antioxidant, anti-inflammatory, anti-coagulant, antimicrobial, anti-viral, anti tumour, tissue healing properties and hypo cholesterolemic activity in marine algae. Since seventeenth century marine algae have long been used for biomedical purposes because of their potential phyto chemical constituents and highly diverse nature. Algae can be classified into two groups based on their size: phytoplankton (microalgae) having 5000 different species and seaweed (macroalgae) with 6000 species.

Seaweeds are the colloquial term for eukaryotic organism especially macroscopic, muticellular benthic marine algae that live in salty water. They are one of the biggest biomass producers in ocean and an important wellspring of bioactive natural products. Seaweeds have

been used as part of the diet, feed, fertilizer and as source of traditional medicine in many parts of Asin continent since prehistoric times.

Different kingdoms of seaweeds represent the reservoir of good biopotential of bioactive natural product. Irkin and Yayintas (2018) has documented that they are growing in a wide range of sizes including more than 10,000 species of the fastest growing plants all over the world in a variety of shapes and colors due to the presence of various environmental conditions. Most probably, seaweeds are attached or freely floating primitive plants due to that they lack true root, stem and leaves composed important marine living renewable resources as well.

Usually, they grow in deep-sea areas up to 180 m in depth. In estuaries and black water on solid substrates like pebbles, rocks, dead corals, shells, and plant material are attached to the bottom in comparatively shallow rocky coastal areas, particularly where they are exposed at low tide constituting one of the important living resources of the ocean.

Marine algae are classified into four groups based on their pigmentation, nature of their cell walls, and reserve polysaccharides such as the prokaryotic Cyanophyceae and the eukaryotic Ochrophyta (brown algae), Rhodophyta (red algae), and Chlorophyta (green algae) (Parthiban and Anantharaman, 2018). Several earlier studies noticed that seaweeds play a vital role in supporting marine biodiversity because they are one of the primary producers and the base of the food chain in oceans.

In particular, among the coastal population, seaweeds are utilized in edible forms known as “sea vegetables” due to the presence of dietary fiber, protein, and minerals that serve as alternative sources. In addition to that the secondary metabolites from seaweed origin possess various commercial applications in the medical, pharmaceutical, nutraceutical, agricultural and cosmetic industries because of their bioactivities. Usually, seaweeds are found in the intertidal, superficial and deep waters of the sea. They are present even at the depth of 180 m in estuaries and in backwaters. Abundant growth of green, brown and red algae exists along the Southern Tamil Nadu coast from Rameswaram to Kanyakumari covering 21 islands of Gulf of Mannar. In India, about 740 species and 220 genera of marine algae were authentically registered and out of 60 species are highly economic value based on their bioactive compounds.

Some of the earlier researchers endorsed the marine algae possess astonishing potential as an enhancement in food or for the extraction of bioactive compounds like polysaccharides,

minerals and essential nutrients, proteins, lipids and polyphenols, with antibacterial, antifungal, antiviral properties, and so forth. The presence of these types of compound is consumed in the improvement of new pharmaceutical specialists. In this regard, the Phaeophyceae members play a vital role in marine environments both as food and for the habitats they form. Most of the brown algae contain the pigment fucoxanthin, which is the main reason for the formation of greenish-brown colour that gives them this name. Additionally, brown algae also produce a wide range of bioactive compounds like phlorotannins and many of which have biopotentialities.

Furthermore, the brown alga contains some of the minor polysaccharides like fucoidans in their cell wall. Similarly, the green alga contains ulvans and xylans are found in red and green alga. The storage polysaccharides like laminarin in brown algae and floridean starch in red algae are not digested by human intestinal bacteria and thus can be regarded as dietary fibers. Particularly, fucoidans is one among the significant polysaccharides that possess noteworthy bioactive functions such as anti-proliferative, anticancer, anti-coagulant, anti-thrombotic, anti-viral, anti-inflammatory, and anti-complementary agent. Most of the viscous soluble polysaccharides from marine algae have been documented for the therapeutic potential such as hypocholesterolemic and hypoglycemic activity which is due to that divergent physiological effects.

Marine algae obtain an astonishing treasure of minerals, macro, and trace elements from the sea. The presence of mineral fraction in marine algae contains 36% of dry matter that varies with species, seasonal influences, wave exposure, environmental and physiological influences, and the processing and mineralization methods. In addition to that, marine algae are remarkable sources of vitamins A, B, C, and E, and minerals. It has been noticed that the vitamin C content of Nori is 1.5 times higher than in oranges. Also, vitamin B is found in an abundant amount in all marine algae that belong to Phaeophyceae, and traditionally, they have been used for treatment of thyroid goiters.

References

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