

Preparation of Novel Therapeutic Food Using Seaweed Ulva and Its Analytical Characterization for the Consumption of Human Beings

K. Kavitha* and S. Sumayaa

Department of Home Science Thassim Beevi Abdul kadar college, Kilakarai, Ramanathapuram, Tamil Nadu, India.

ABSTRACT

Seaweed being used as a food in many countries possesses therapeutic properties. It has been used as a staple item of diet. Seaweeds offer a wide range of therapeutic possibilities both internally and externally. Simply eating unprocessed dried seaweeds can yield many healing benefits. Many physical ailments in both humans can be regularly resolved with the simple addition of seaweeds to their respective diets. Although therapeutic seaweed constituents can be extracted singly or in clusters, in cases of chronic conditions. Positive therapeutic changes caused by eating seaweeds regularly may take several weeks to several months to become obvious. When patients are oral adverse to the tastes, smells, and/or textures of seaweeds, add seaweeds as small pieces or powder(s) to foods strongly flavoured with spices such as: cayenne, fried onions, raw garlic, chili powder, curry, or vinegar. Seaweeds as the Best Dietary Sources of Essential Minerals. In this paper, a novel method of preparation of the food using seaweed as one of the primary ingredient has been discussed. Keeping in consideration of the various medicinal effects of the seaweeds for the wellbeing of the human beings, ulva, sargasm seaweed has been selected. The method of preparation of the food using seaweed has been discussed in detail. The prepared food is given to patients with diabetes, goiter, and thyroid. The results obtained from the patients after taking seaweeds Ulva, sargasm as one of the major ingredients is remarkably good. The characterization of the newly prepared seaweed food confirms its suitability for the consumption of the human beings with various health disorders.

INTRODUCTION

Edible seaweed are algae that can be eaten and used in the preparation of food. It typically contains high amounts of fiber and they contain a complete protein¹. They may belong to one of several groups of multicellular algae: the red algae, green algae, and brown algae. Seaweeds are also harvested or cultivated for the extraction of alginate, agar and carrageenan. Hydrocolloids have attained commercial significance, especially in food production as food additives². The food industry exploits the gelling, water-retention, emulsifying and other physical properties of these hydrocolloids. Most edible seaweeds are marine algae whereas most freshwater algae are toxic. While marine algae are not toxic, some do contain acids that irritate the digestion canal, while some others can have a laxative and electrolyte-balancing effect³. The dish often served in western Chinese restaurants as 'Crispy Seaweed' is not seaweed but cabbage that has been dried and then fried⁴. Seaweeds are used

extensively as food in coastal cuisines around the world. Seaweed has been a part of diets in China,, Japan and Korea since prehistoric times⁵. Seaweed is also consumed in many traditional European societies, in Iceland and western Norway, the Atlantic coast of France, northern and western Ireland, Wales and some coastal parts of South West England⁶ as well as Nova Scotia and Newfoundland. The people of New Zealand traditionally used a few species of red and green seaweed⁷. Seaweeds are sources of bioactive components. The complex polysaccharides from the brown, red and green seaweeds possess broad spectrum of therapeutic properties. Especially, the sulfated polysaccharides, viz. fucans, carrageenans and ulva have exhibited strong antioxidant, antitumor, immunostimulatory, anti-inflammatory, pulmonary fibrosis anticoagulant/antithrombotic, lipid lowering, antiviral, antibacterial, antiprotozoan, hyperplasia prevention, gastrointestinal, regenerative and nano medicine applications.

Seaweed is full of vitamins, minerals and fiber. The medicinal effects of seaweed have been legion for thousands of years. The ancient Romans used them to treat wounds, burns and rashes. Seaweed contains high levels of iodine. Polysachharides in seaweed may be metabolized in humans through the action of bacterial gut enzymes.

Sargassum as a Human food

Sargassum is a genus of brown (class Phaeophyceae) macroalgae (seaweed) in the order Fucales. Numerous species are distributed throughout the temperate and tropical oceans of the world, where they generally inhabit shallow water and coral reefs. However, the genus may be best known for its planktonic (free-floating) species. While most species within the class Phaeophyceae are predominantly cold water organisms that benefit from nutrients upwelling, genus *Sargassum* appears to be an exception to this general rule. Any number of the normally benthic species may take on a planktonic, often pelagic existence after being removed from reefs during rough weather. The Atlantic Ocean's Sargasso Sea was named after the algae, as it hosts a large amount of *Sargassum*.

History

Sargassum was named by the Portuguese sailors who found it in the Sargasso sea after a species of rock rose (*Helianthemum*) that grew in their water wells at home and that was called sargaço in Portuguese. The Florida Keys and its smaller islands are well known for their high levels of *Sargassum* covering their shores. Gulfweed was observed by Columbus. Although it was formerly thought to cover the entirety of the Sargasso Sea, making navigation impossible, it has since been found to occur only in drifts. *Sargassum* is also cultivated and cleaned for use as an herbal remedy. Many Chinese herbalists prescribe powdered *Sargassum* in paper packets of 0.5 gram, to be dissolved in warm water and drunk as a tea. It is said to remove excess phlegm. When sold in this application it is commonly referred to as Seaweed *Sargassum* Tea.

Sargassum muticum is large brown seaweed of the class Phaeophyceae. It grows attached to rocks by a perennial hold fast. Up to 5 cm in diameter. From this holdfast the main axis grows to a maximum of 5 cm high. The leaf-like laminae and primary lateral branches grow from this stipe. In warm waters it can grow to 12 m long, however in British waters it gives rise to a single main axis with secondary and tertiary branches which are shed annually.

Numerous small 2–6 mm stalked air vesicles provide buoyancy. The reproductive receptacles are also stalked and develop in the axils of leafy laminae. It is self-fertile.

Ulva Lactuca as a Human Food

Ulva lactuca is commonly called sea lettuce. Its color can range from light yellowish green to darker green, but is most commonly a vivid green underwater. When exposed at low tide or when washed up on a beach, it is typically darker green. Out of the water the seaweed looks like a rather slimy lime-green mass but in the water the alga actually does look very much like young lettuce leaves. *Ulva lactuca* is vivid green and cellophane thin (only two cell layers thick), and forms light yellowish green to dark green translucent sheets. The soft frond grows as a single, irregular, but somewhat round shaped blade with slightly ruffled edges which are often torn. There can be numerous small holes or perforations scattered throughout. The frond is connected to rocks with a small, almost invisible discoid holdfast, and does not have a stipe. *Ulva lactuca* may grow to a diameter of 20 to 30 centimeters, although it is frequently much smaller, with larger sheets feeling slightly thicker than smaller specimens.

Ulva lactuca can be found in an array of habitats, but is seen more abundantly in sheltered bays or in protected and semi-protected areas with limited wave action. It is found in tide pools, rock pools, cobble, boulders, and bedrock in mid- to lower levels of the intertidal zone, and also grows in the sublittoral to a depth of over 20 meters. In very sheltered conditions, plants that have become detached from the substrate can continue to grow, forming extensive floating mats or rafts. *Ulva lactuca* tolerates brackish conditions and can be found on suitable substrata in estuaries. It is present year round, but most abundant in summer and fall.

Ulva lactuca grows well in areas polluted with sewage, as it is a nutrient scavenger, and is also an opportunistic species that can form massive blooms when conditions are right. Certain environmental conditions can lead to the algae spreading over large areas. Non-point source pollution including nutrient runoff from agricultural lands and over-fertilized urban and rural sites are thought to be a contributing factor in sea lettuce blooms. The result is that large quantities of *Ulva lactuca* are washed up on beaches, where their decay produces methane, hydrogen sulphide, and other gases. As the bloom spreads and begins to die, it can deplete an area (and all of the bottom dwelling plants and

animals that live there) of oxygen, and cause massive die-offs of fish and invertebrates.

Uses

Ulva lactuca is available in different forms from companies in countries which include the UK, Ireland, France, Germany, Vietnam, China, Canada, and the United States. It is sold both in fresh and dried form, in flakes, powders, and salad mixes. It is a delicate seaweed with a mild flavor. Ulva lactuca is sometimes eaten as "green laver", but it is considered inferior to purple laver. It is used as a seasoning by itself and in blends, and can be found in soups and salads. It is a key ingredient in many cosmetic and personal care items such as soap, lotion, toner, lifting cream, eye cream, lip cream, makeup remover, body polish, bath soaks, anti-aging products, shaving lotion, shampoo, conditioner, and serums. It is also a component in gardening and fertilizer products. Leading cosmetic brands which use Ulva lactuca as an ingredient in anti-aging products cite that it contains a high concentration of amino acids (proline, glycine, lysine) which are the basic components of proteins, and that it has an ability to stimulate the cells in the connective tissues to synthesize collagen.

Novel seaweed Food

Sargasam Salad

We have prepared a novel salad for human consumption. The preparation procedure is as follows. Chop the sargasam seaweed into fine pieces. Slice onion very thinly and chop finely, mixing together. Toast sargasam seaweed with onion by adding few drops of olive oil. Add pinch of cumin, saffron and cinnamon as it gives a sweet taste. Sprinkle lemon juice and salt and toast it. After a while serve it. This salad is nutritious and filled with flavour.

Ulva with Carrot

Ulva seaweed is chopped into fine pieces and soak in water for ten minutes. Boil the soaked ulva with grated ginger uncovered and on low until most of the liquid has evaporated. Add the carrots. Cover and cook until carrots are slightly tender. Remove the lid and cook until all the water has evaporated.

CONCLUSION

In this article we have proposed a novel method of human food using the seaweed sargasam and Ulva. It is expected to possess anti-diabetic activities.

REFERENCES

1. Wong KH and Peter CK Cheung. Nutritional evaluation of some subtropical red and green seaweeds: Part I — proximate composition, amino acid profiles and some physico-chemical properties. *Food Chemistry*. 2000;71(4):475-482.
2. Round FE. *The Biology of the Algae*. Edward Arnold Ltd. 1962.
3. Wiseman. *John SAS Survival Handbook*
4. Hom and Ken. *CRISP SEAWEED*. Good Food Channel. UK TV.CO.UK. Retrieved 2014.
5. Micronutrient Information Center: Iodine. Oregon State University: Linus Pauling Institute. Retrieved 2011-11-11.
6. Albay folk promote seaweed 'pansit'. ABS-CBN Regional Network Group. 2008-04-08. Retrieved 2009-08-04.
7. Hehemann, Jan-Hendrik, Correc, Gaëlle, Barbeyron, Tristan, Helbert, William, Czjzek, Mirjam, Michel and Gurvan. Transfer of carbohydrate-active enzymes from marine bacteria to Japanese gut microbiota. *Nature*. 464(7290):908-912.