



## Red Algae's and its Medicinal and Therapeutic Uses

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The red algae, or Rhodophyta are one of the oldest groups of eukaryotic algae,<sup>[2]</sup> and also one of the largest, with about 5,000–6,000 species<sup>[3]</sup> of mostly multicellular, marine algae, including many notable seaweeds. Other references indicate as many as 10,000 species;<sup>[4]</sup> more detailed counts indicate about 4,000 in about 600 genera (3,738 marine species in 546 genera and 10 orders (plus the unclassifiable); 164 freshwater species in 30 genera in eight orders).<sup>[5]</sup>

The red algae form a distinct group characterized by these attributes: eukaryotic cells without flagella and centrioles, using florid anpolysaccharides as food reserves, with phycobiliproteins as accessory pigments (giving them their red color), and with chloroplasts lacking external endoplasmic reticulum and containing unstacked thylakoids.<sup>[4]</sup> Most red algae are also multicellular, macroscopic, marine, and have sexual reproduction.

Many of the coralline algae, which secrete calcium carbonate and play a major role in building coral reefs, belong here. Red algae such as dulse (*Palmaria palmata*) and laver are a traditional part of European and Asian cuisines and are used to make other products such as agar, carrageenan's and other food additives.<sup>[6]</sup>



**Figure 1:** Red Algae

Historically, there has been no long term relief for chronic sufferers of herpes simplex infections, let

alone a cure. Herpes sufferers are seemingly at the mercy of this viral menace. Despite failure at the eradication of the herpes virus, success in the short term by temporarily suppressing its proliferation has yielded positive results. One such agent, acyclovir, a nucleoside analogue, has been regarded as the drug of choice by the medical community. However, as with most drugs, there are side effects. Are there no alternatives?

There are as many known factors which contribute to a chronic case of herpes, while other factors remain a mystery. Finding ways to stop or curb some of the known factors which predispose one to herpes activity can be helpful. Chronic herpes sufferers are well accustomed to the recommended restrictions in diet and lifestyle. Yet, even healthy individuals who seemingly do everything right to lead a herpes-free life cannot escape this relentless virus. So, what's next?

Treatment with acyclovir relieves symptoms, reduces the amount of infectious virus released from the sores and speeds healing. The treatment does not prevent subsequent attacks or diminish their frequency or severity. The effect of acyclovir in a herpes virus infection is to inhibit the synthesis of viral DNA. Prophylactic courses of oral acyclovir can have a modest impact on recurrent infections, but the cost of the drug and its potential toxicity over the long term do not justify such regimens in most cases. In the majority of cases for genital herpes, general recurrence patterns returned within 8 to 25 days after stopping long term use.

Laboratory studies suggest prolonged administration of acyclovir as a prophylactic or its prescription for trivial infections might favor the appearance of virus strains that are both drug-resistant and pathogenic. This concern over the advent of drug resistant pathogens has recently come to pass. The NIB reported that a new strain of genital herpes (HSV-II) has evolved upon which acyclovir had no effect.

Given the drug like nature of acyclovir, with side effects included, herpes sufferers have sought a natural approach to prevent or suppress their herpes symptoms. The most popular natural remedy, sold in health food stores, are high doses of the amino acid L-lysine. High doses of L-lysine, which is an essential amino acid, have been clinically shown to suppress the proliferation of the herpes virus. Earlier research revealed that some amino acids increased growth in viral activity and others decreased such activity. Further studies showed that one could effectively alter the chemistry of the cellular environment by increasing the availability of a particular amino acid. In the case of L-lysine, inducing a higher concentration of L-lysine was shown to lower the arginine cellular concentration. The effect of depleting the existing reserves of arginine (a non-essential amino acid) combined with the presence of L-lysine effectively thwarts assembly of viral protein coats. Without this vital structural component, herpes viruses cannot invade new cells. Potential herpes infections are thus temporarily aborted.

Acyclovir and L-lysine, although widely used, have provided variable success for its users. The fact

that known side effects from taking acyclovir include nausea, vomiting, diarrhea, dizziness and headache are not encouraging given that effective treatment of acyclovir requires daily use. Also, little is known about the long term effects and toxicity. One study showed chromosome damage when taking large doses even though low dosages are considered safe. L-lysine, once announced as a major medical breakthrough in the prevention of herpes disease, has its downside as well. Research has shown that a decrease in arginine lowers lymphocyte immune reactivity in healthy human beings. Essentially, an increase in daily intake of L-lysine has the net effect of lowering our natural immunity due to the decrease of arginine in the cellular environment (perhaps arginine, once thought non-essential is becoming increasingly essential for our own survival). The fact that it suppresses herpes simplex viral activity is significant, but not at the expense of our adaptive immune system. Neither acyclovir nor L-lysine is recommended for long term prophylactic treatment. Individuals seeking a daily maintenance dosage to ward off herpes outbreaks would be ill advised to rely on L-lysine or acyclovir. Chronic herpes sufferers would be better off to investigate other means to prevent or suppress their herpes condition. Is there no hope?

One such casualty of the drug approval process is red marine algae. Research on antiviral carbohydrates from marine red algae indicates a high potential for low-cost, broad spectrum antiviral agents. Further research into Red Marine Algae produced two patents where clinical efficacy for herpes I and II was clearly shown. The treatment was effective for treating subjects (e.g. human patients) both prior to and subsequent to herpes infection. It was used topically to alleviate symptoms associated with herpes infections or preferably systemic, by oral administration, to eradicate the virus and thereby prevent symptom recurrence. No side effects or toxicity were noted. This treatment, which now must be considered alternative, suggests a breakthrough in the discovery of natural immunomodulatory and antiviral agents.

Recent research and gathering of anecdotal evidence on the health benefits and ant herpetic action of red marine algae has yielded much promise. Its use as a topical has been further documented and thought superior to acyclovir. It was shown to be clinically effective against herpes zoster infections as well. Anecdotal reports from patients suffering from Epstein Barr (another herpes virus) and Candida have shown marked improvement in a short period of time through oral administration.

General health benefits show red marine algae useful in weight-loss programs and for lowering cholesterol and fat in the blood. It contains soothing, mucilaginous gels such as align, carrageenan, and agar, which specifically rejuvenate the lungs and gastrointestinal tract. Once thought of as a liability that blocked assimilation, the tough cell wall in Dumontiaceae has been found to be invaluable. It binds with heavy metal, pesticides, and carcinogens, and carries these toxins safely out of the body. Contained within the cell walls are simple sugars called complex polysaccharides. These long chained complex sugars stimulate interferon production as well as other anti-tumor and immune-enhancing activity (improving activity of T- and B-cells). Other compounds in the cell wall are related to those found in friendly bacteria which fortify and strengthen

our immune systems to fight against invading organisms and toxins.

Although the effects of long term use of an alternative treatment such as the red marine algae, Dumontiaceae, has not been clinically substantiated, edible seaweeds have been consumed for thousands of years and are considered safe, nutritious, and beneficial. The added dimension that science has uncovered surrounding its antiviral and immunomodulatory potential; opens up a whole new source of food that could serve to palliate or even hopefully cure virally caused diseases. Since most life derived from the sea, the novel idea that the ocean lies untapped as perhaps our greatest medicinal resource is entirely possible and may be critical to our human survival.

### **Therapeutic Applications:**

Researchers in the mid-seventies and early eighties were exploring rare algae that potentially modeled immunomodulatory activity in humans. Investigations revealed some thirty species which enhanced the immune system's regulatory response and were shown to be antiviral. The more promising part of this discovery was the antiviral specificity of each species towards a variety of pathogens.

Current research on red marine algae has exhibited promising results in controlling and reducing both Candida and Herpes Simplex Virus populations. Patients have reported a stopping or lessening of growth within the body. Researchers believe these special algae may serve as a gateway to resist or even cure many bacteria, fungi, or and viral pathogens.

Could algae, commonly known as ocean vegetables, be one of the most important new therapeutic food? Scientific research has only reinforced the medicinal and nutritional importance of ocean vegetables. Numerous cultures have used ocean vegetables to complement their healthy diet. Ocean vegetables were most commonly used to prevent aging and prolong life. Since all life evolved from the sea, we may think of the ocean as a vast nutritional soup that lies untapped as perhaps our greatest medicinal resource.

The powers of ocean vegetables have been sought for thousands of years for their ability to prolong life, prevent disease, and enhance life. Ocean vegetables contain ten to twenty times the minerals of land plants, as well as an abundance of vitamins and other elements necessary for proper metabolism. Each ocean vegetable exhibits a distinct nutrient profile and a selective nature for its medicinal use. Current research has now established a link between nutrient-rich red marine algae and the body's immune system response.

Our ability to survive in a hostile environment that may seem out of control demands that we take steps to recover our health and maintain our immunity. Therein ocean vegetables may be one of our most important allies in a changing world.

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