



Review Article

A Review: Seaweed as a Skin Care and Enormous Human Health Benefits

Habeeba S. Shaikh^{*1}, Siddiqua S. Shaikh² and Ashvini S. Bankar³

¹Dept. of Pharmacognosy, Pravara Rural College of Pharmacy, Pravaranagar, Maharashtra, India.

² Dept. of Pharmaceutical Chemistry, SND College of Pharmacy, Yeola, Maharashtra, India.

³ Dept. of Pharmacognosy, Pravara Rural College of Pharmacy, Pravaranagar, Maharashtra, India..

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ABSTRACT

Seaweed is the name given to species of marine plants and algae that grow in ocean, river, and lakes. It have common name for countless species of marine plants and algae. Seaweed is the marine macro algae are primitive non- flowering plants without true root and stem which have loose colloquial term encompassing macroscopic, multicellular, benthic marine algae. The seaweeds can be classified by use (as food, medicine, fertilizer and industrial etc.). It plays an important role in human health & skin care cosmetic product. The seaweeds produce specific biological properties which are used as a several industrial applications such as functional foods, pharmaceuticals and cosmeceuticals industry. In cosmeceuticals industry it heals acne, rosacea, and sensitive skin. It diminishes the appearance of fine lines and wrinkle and it have ability to brighten and moisturizes the skin. The advantages of Seaweeds have an important role in modulating chronic disease. It contains antioxidant compounds such as (phlorotannins, pigments, tocopherols, and polysaccharides). The reviewed literature focus on the multifunctional properties of seaweeds will improve natural based products specially the ability to incorporate these functional properties with its various applications.

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*Corresponding author: Habeeba S. Shaikh, Dept. of Pharmacognosy, Pravara Rural College of Pharmacy, Pravaranagar, Maharashtra, India. Contact-+91 8975155843; e- mail: habibashaikh762@gmail.com

Introduction

The marine algae are generally referred as marine macro algae or seaweeds. The seaweeds which are living and mainly notably found in littoral habitats or attached to rocks. They are grow in shallow coastal waters as well as in deep sea areas up to a depth of 180 m. Seaweeds are three type such as, brown algae, red algae and green algae. Seaweeds are obtained from via

harvesting of natural resources or via cultivation. With regard to human consumption, and this are used either as whole seaweed as a part of the diet; as a food supplement; or as a source of polysaccharide-based ingredients, such as alginate and carrageenan. There are many different types of seaweed contain anti-inflammatory and anti-microbial agents. The ancient Egyptians and Roman are used them as a

treatment for breast cancer and in treatment of burns, wound, rashes. Certain seaweeds which contain the powerful cancer-fighting agents that researchers hope will successfully prove

effective in the treatment of malignant tumors and leukemia in people (Pangestuti, R., *et al*, 2013).



Fig. 1: Different types of Seaweeds

Extraction of Seaweed

The Bioactive compounds are extracted from seaweed using different type of methods. Several factors which reported to have an influence on extraction yield, like type of solvent applied, solid:liquid ratio, extraction time, and temperature (Li, Y., *et al*, 2017).

The method mostly applied is solid–liquid extraction with the use of solvents. Moreover, the use of traditional solvents for the extraction of bioactive compounds has several drawbacks, such as the need for huge amounts of organic solvent, longer extraction time, selectivity problems (Kadam, S., *et al* 2017).

Benefits of Seaweed for Skin Health

The seaweed has specific unique properties in their own way. The seaweed is three type green, brown and red. The difference in seaweed is depending on the pigmentation of their skin which gives them unique, natural abilities to hydrate and repair the skin.

seaweed in skin care application- The cosmeceuticals are commercially available products that is only improve the texture of the skin but also benefit to the health of the skin

because of their antioxygenation. A number of skincare product, whether it comes in a liquid, gel, serum, lotion, or cream, which contain a potent array of stable antioxidants to interrupt free radical damage and keep it from harming the skin. It is easy to feel that one of the most effective ingredients of cosmeceuticals is the antioxidant which can interrupt the radical-chain processes which assist the skin to repair systems (Wang H.M.D., *et al*, 2015). The beauty care products is concern on compounds with potential antioxidant activity, MMPs, and tyrosinase inhibitory activity in order to decrease ROS caused by UV radiation and also to delay skin aging.

Application of Seaweed in Human Health

Good Source of Vitamins and Minerals

The different type of seaweed which have a unique set of nutrients. Sprinkling some dried seaweed in food not only adds taste, texture and flavor in meal, but it's an easy way to boost our intake of vitamins and minerals. Seaweed contains small proportion of vitamins A, C, E and K, along with folate, zinc, sodium, calcium and magnesium (Maeda H., *et al*, 20008). Some

of the protein present in some seaweed, such as spirulina and chlorella, contain all of the essential amino acids. This means seaweed can help ensure to get the full range of amino acids. Seaweed is good source of omega-3 fats and vitamin B12. In fact, the dried green and purple seaweed contain substantial amounts of vitamin B12. One research found 2.4 mcg or 100% of the RDI of vitamin B12 in only 4 grams of seaweed (Oroian M., *et al*, 2015).

Provides Fiber and Polysaccharides That Can Support the Gut Health

Gut bacteria play an enormous role in health. It's estimated that have more bacteria cells in the body than human cells. An imbalance in gut bacteria can lead to sickness and disease. Seaweed is good source of fiber, which is known to promote gut health. Fiber can resist digestion and be used as a food source for bacteria in the large intestine instead. In additionally, a sugars found in seaweed called sulfated polysaccharides have been shown to increase the growth of "good" gut bacteria. These polysaccharides can also increase the production of short-chain fatty acids (SCFA), which provide support and nourishment to the cells lining to the gut (Sender, R., *et al*, 2016)

Weight management

The seaweed contains a lot of fiber, which does not contain any calories. The fiber in seaweed may slow stomach emptying, too. This helps to feel fuller for longer and can delay hunger pangs. The seaweed is also considered to have weight loss effects. The number of animal studies suggests that a substance in seaweed called fucoxanthin may help reduce body fat. The one animal research found that rats who consumed fucoxanthin lost weight, whereas rats who consumed the control diet did not. Results showed that fucoxanthin expand the expression of a protein that metabolizes fat in rats). Other animal studies found similar results. For example, fucoxanthin has been shown to importantly reduce blood sugar levels in rats, further aiding weight loss. The results in animal studies show very promising; it's significant that human studies are conducted to verify these findings (Maeda, H., *et al*, 2009).

Seaweed as beauty enhancer

In alotherapy in which, seaweed extracts are used in health or beauty treatments. The seaweed baths as a treatment for arthritis, rheumatism and other aches and pains. The several companies producing a seaweed powder (made mainly from *Ascophyllum nodosum*) for beauty and body care products containing seaweed extracts. Several compounds extracted from seaweeds are thought to be of value in various cosmetic applications and some are now becoming commercially significant (V. Lobo, *et al*, 2010).

Contains a Variety of Protective Antioxidants

Antioxidants can make unstable substances in the body called free radicals less reactive. This makes them less likely to damage the cells. However, the excess free radical production is considered to be an underlying cause of several diseases, such as heart disease and diabetes. These have been shown to protect the body's cells from free radical damage. A lot of research has focused on one particular carotenoid called fucoxanthin. It's the main carotenoid found in brown algae, such as wakame, and it has 13.5 times the antioxidant capacity as vitamin E. Fucoxanthin has been shown to protect cell membranes better than vitamin A (Cho S-H, *et al*, 2007).

Reduce Heart Disease Risk

The seaweed helps to reduce the blood cholesterol levels. The 18-week study fed rats with high cholesterol a high-fat diet supplemented with 10% freeze-dried seaweed. It found the rats had 40% lower total cholesterol, 36% lower LDL cholesterol and 31% lower triglyceride levels. Heart disease is caused by excessive blood clotting. The seaweed which contains carbohydrates called fucans, which help to prevent blood from clotting the animal study found that fucans extracted from seaweed prevented blood clotting as effectively as an anti-clotting drug. Researchers are also starting to look at peptides in seaweed. Initial studies in animals indicate that these protein-like structures may block part of a pathway which raised the blood pressure in the body. The large-scale human studies are required to confirm these results (Roberts, A.W., *et al*, 2010).

Reduce the Risk of Type 2 Diabetes by Improving Blood Sugar Control

Diabetes is a major health problem. It occurs when the body is unable to balance the blood sugar levels over time. The seaweed has become a research focus ways to support people who are at risk of diabetes. The Japanese people study and proved that the fucoxanthin, a substance in brown seaweed, it help to improve blood sugar control. The study found that fucoxanthin had improved blood sugar levels. The study also noted additional improvements in blood sugar levels in those with a genetic disposition to insulin resistance, which usually accompanies type 2 diabetes. What's more, another substance in seaweed called alginate prevented blood sugar spikes in animals after they were fed a high-sugar meal. Many other animal studies have reported that it improved blood sugar control when seaweed extracts are added to the diet (Torsdottir I Alpsten M Holm G., *et al* 1991).

Bone Health

Osteoporosis is a degenerative disease defined as reduced bone mass and micro architectural deterioration, which results in decreased bone strength and increased fracture risk. Diet improve to increase the consumption of calcium-rich food sources in order to promote maintenance of bone health would contribute greatly to addressing the burden of osteoporosis. Calcium and vitamin D are the two most significant micronutrients for bone health; however, other dietary components, such as non digestible prebiotic carbohydrates, are emerging as possible contributors because of their ability to enhance calcium absorption and bioavailability. It is highly plausible that marine sources rich in minerals (in particular, calcium) may help raised the calcium intake through dietary sources. For example, some varieties of seaweed have a higher content of calcium than other dietary sources on a wt/wt basis: for instance, the calcium content of *Ascophyllum nodosum* (575.0 mg/100 g wet weight (Bonjour JP Gueguen L Palacios C., *et al*, 2009).

Cancer

The seaweed which are effective in the treatment of cancer. The person who consume seaweed it observred that cancer incidence is much lower

among populations who consume a seaweed-rich diet (Yang, Y.J., *et al*, 2010).

Antiviral Properties

The another benefit of seaweed have antiviralproperty the invivo and vitro study animal research has identified carrageenans, fucoidans and sulfate and ficoidans and sulfated thamnogalactans as having substantial antiviral activity against enveloped virus such as herps and HIV (Spieler R., *et al*, 2002).

Metabolic Syndrome

The metabolic syndrome is characterized by symptoms that are also related to CVD. Research in animal models has suggested a role for algae in the treatment and prevention of metabolic syndrome. Evidence from the Nutrition and Health Study in Taiwan suggests several foods that may protect against metabolic syndrome, including seaweed, which was linked to a reduction in the increase of metabolic syndrome prevalence in women (Shin A *et al*, 2009).

Conclusion

This review article describes the role of seaweed in skin care & human health benefit. Due to the Pollution and overexposure of human skin to several environmental factors such as UV and pollution. This pollution leads to the skin related problem such as a hyper pigmentation, acne & pre-mature aging problem. The biologically active compound present in the seaweed proves that the way to the used as an active ingredient in the cosmetic industries due to their potent skin protection ability. The seaweed is used to treat the various skin related problem such as whitening agent, anti- aging, anti-acne and also for moisturizing in cosmetic industries. The seaweed also plays major role therapeutic application in human health management. Current data on the health benefits of seaweed is both potential and health status (digestive health, weight management) and chronic disease (cancer, CVD, diabetes, and osteoporosis). The various activity and safety concerns of these compounds are very significant for future challenges in health benefit as well as in cosmetics industry.

Conflicts of Interests

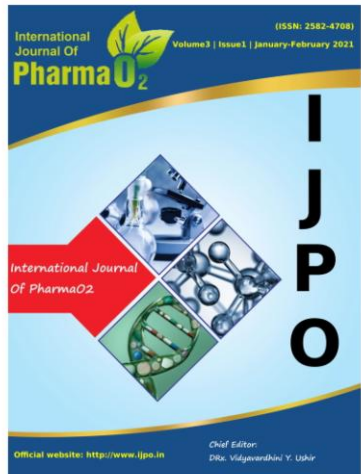
Authors do not have any conflicts of interest with the publication of the manuscript.

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