

Role of Algae in Skin Benefits: An Alternative to Chemical Cosmetics

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Abstract

Nowadays, in order to get fair skin, to get protection from the sun, to moisturize skin, to get glow on the face and prevent the wrinkling and aging cosmetics are used by the people. According to certain research reports, algal products used in cosmeceuticals have been known to be suitable alternatives with constructive effect even after prolonged usage. Many algal species have the anti-wrinkling, anti-aging, photo protection, whitening agents which are widely used in the cosmetics. This review basically focuses on the applications of the algal components extracted from macro marine algal species for its use in the cosmetics.

Keywords: Macro Algae; Cosmetics; Anti-aging; Anti-wrinkling; Skin Whitening; Moisturizing Agent; Antioxidants

Introduction

Use of the cosmetics have increased in our day-to-day life. This synthetic compound can be harmful for our skin. Marine algal photoprotective substances exhibit a wide selection of biological activities like UV absorbing, antioxidants, matrix-metalloproteinase, antiaging, and immune-modulatory activity. Structurally, phenolic compounds comprise an aromatic ring, bearing one or more hydroxyl substituents, and range from simple phenolic molecules to highly polymerized compounds. Their skin benefits indicated in table 1. Marine Algal products can be used as alternative for cosmetics as they have the properties of antioxidants, sunscreens, thickening agents, skin sensitizers, moisturizing agents to enhance the competence of skin against abrasions, tanning, etc [2]. Marine algae are divided into three: *Chlorophyceae* (green algae) *Phaeophyceae* (brown algae) *Rhodophyceae* (red algae) These marine algae possess many properties which is helpful in the cosmetics which are as follow.

Sr. No.	Name of Algae	Types	Activity	References
1	<i>S. japonica</i> , <i>Chondrus crispus</i> , and <i>Codium tomentosum</i>	Macroalgae	Moisturizing agent	[1]
2	<i>Spirulina maxima</i> and <i>Chlorella vulgaris</i>	Microalgae	antioxidants	[2]
3	Sea Palm (<i>Postelsiapal maeformis</i>)	-	Skin softening, anti-wrinkle, nourishing, moisturizing, antiinflammatory	[3]

4	<i>Chlorella vulgaris</i>	Microalgae	Anti-aging, de-pigmentation, moisturizing and thickening agent	[4]
5	<i>T. decurrens</i>	Macroalgae	antioxidant activity	[5]
6	<i>Chondria baileyana</i>	Microalgae	antioxidant activity	[6]
7	<i>Monodus sp., Thalassiosira sp., Chaeloceros sp., and Chlorococcum sp.</i>	Microalgae	anti-aging	[7]
8	<i>Ulva lactuca</i>	Macroalgae	Moisturizing and anti-inflammatory agent	[8]
9	<i>Hizikia Fusiforme</i>	Macroalgae	Whitening agent	[8]
10	<i>Fucus vesiculosus</i>	Macroalgae	Skin softness and elasticity	[8]
11	<i>Nostoc sphaericum</i>	Microalgae	Antioxidant: radical scavenging, UV protective	[9]
12	<i>Eisenia bicyclis, Ecklonia stolonifera, Ecklonia cava, Ecklonia kurome, and Hizikia fusiformis</i>	Macroalgae	Antioxidant	[10]
13	<i>E. bicyclis, and H. fusiformis</i>	Macroalgae	Antioxidant	[11-13]

14	<i>Tetraselmiss uecica</i>	-	Protective activity	[14]
15	<i>Laminaria japonica</i>	Macroalgae	Skin Moisturizing effect	[15]
16	<i>Ascophyllum nodosum</i>	Macroalgae	Anti-ageing and Smoothing agent	[16]
17	<i>Tetraselmiss Isochrysis</i>	Microalgae	Anti-Oxidant and Ant irritant	[17]
18	<i>Spirulina platensis</i>	Microalgae	Antioxidants Moisturizing agent	[18]
19	<i>Postelsiapal maeformis</i>	Microalgae	Anti-oxidant and Anti-inflammatory agents	[19]
20	<i>Mastocarpus stellatus</i>	Microalgae	Stabilizing agent	[20]
21	<i>Poryphyra tenera</i>	Macroalgae	Photo Protection activity	[21]
22	<i>Cylindrotheca closterium</i>	Microalgae	Antioxidant	[22]
23	<i>Padina crassa</i>	Macroalgae	Antioxidant	[23,24]
24	<i>Cystoseira nodicaulis</i>	Macroalgae	Anti-melanogenic (whitening)	[25]

Table 1: Different types of algae and their skin benefits.

Algae as a remedy for Skin whitening and anti-wrinkling

When direct exposure of the UV rays take place the colour of the skin gets darker. Tyrosinase is the key enzyme in the synthesis of melanin that is responsible for skin colour in mammals [26]. The role of this pigment is protecting the skin against UV and ROS damaging effects [27]. Due to the damaging effect of solar ultraviolet, it decreases pigmentation of the skin. Sometimes it creates bright white spots, dark brown spots, etc. [28].

Algae as a remedy of skin aging

Skin aging is a complex biological activity which refers to the loss of elasticity of skin, appearance of fine lines, ridges, creases and discoloration of the skin with growing age [29]. Our skin is subjected to extreme severities of harsh environmental factors and thus, skin problems like dryness, thinning, skin laxity, fragility, enlarged pores, and sagging of skin leads to premature wrinkles as the elastin fibres slowly undergo deterioration [30]. according to [31] marine *macroalgae* are being considered to be a source of nutrients, antioxidants and can be developed as an antiaging. Some algal species such have the phytochemicals which can be extracted and can be used to bring the elasticity of the skin back.

Algae as moisturizing agent

Moisturizers are made of the components that make the skin softer and prevent it from drying. Traditionally, moisturizers were believed to inhibit the trans epidermal water loss (TEWL) by occlusion. Stratum corneum (SC) although a dead layer acts as an active membrane as suggested by the bricks and mortar model. It is the loss of intercellular lipids, i.e., the ceramides, cholesterol, and fatty acids that form the bilayers, damaging the water barrier formation thus leading to dry skin. Dry skin is noted when the moisture content is <10%, and there is a loss of continuity of the SC. *Ulva lactuca* [8].

Algae as antioxidants

Anti-oxidant compounds are helpful for the glowing skin. According to Antioxidant compounds play an important role against various diseases (e.g., chronic inflammation, atherosclerosis, cancer and cardiovascular disorders) and ageing processes (Kohen and Nyska 2002), which explains their considerable commercial potential in medicine, food production and the cosmetic industry. Anti-oxidant compounds are also helpful for reducing dark spots, dark circles and wrinkles. some of the algal species are the good sources of the anti-oxidant which are *Spirulina maxima* and *Chlorella vulgaris* [2].

Algae as thickening agent and skin sensitizer

Thickening agents are the chemical compounds which are used in the lotions and other cosmetic product to prevent inconsistency. Eg: red algal species of *Gracillaria* and *Gellidium* are mainly used as thickening agents.

Conclusion

We can conclude that marine algal species are the good as well as beneficial source of the phytochemicals which can be used in the cosmetics. The marine ecosystem is a rich source of renewable resources and an abundant source of bioactive substances with both pharmaceutical and cosmetic properties. Several of them have been studied for their antiaging effects on skin, including antiphotaging, radical activity, moisturisation, and collagen biosynthesis and the population ages and we turn into an urbanized makeover worldwide, the need of moisturizers will be ever increasing. This helpful in anti-wrinkling, Skin whitening, moisturizing agent, antioxidants and photoprotection.

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