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Cosmetics for Dermal Care from Marine Origin

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SHORT COMMUNICATION

Atopic dermatitis, skin wrinkling and various other skin related disorders are common problems in now a days [1]. In order to treat these disorders, products especially from marine origin are now a days in fashion. The substances from marine origin including macroalgae, marine collagen, epoxypolysaccharides from cyanobacteria and marine fungi are well known for their therapeutic potential on the skin surface [2-3]. By the use of modern and advanced method of extraction, number of seaweed and other ingredients are being extracted and used in dermal care products.

At present, more than 7000 marine products has been isolated and out of this, 25 % from algae, 33 % from sponges, 18 % from coelenterates (sea whips, sea fans and soft corals), and 24 % from other invertebrate phyla such as ascidians (also called tunicates), opisthobranch molluscs (nudibranchs, sea hares etc), echinoderms (starfish, sea cucumbers etc) and bryozoans (moss animals) are used [4-6].

The important chemical agents isolated from marine source include Bryostatin 1, Didemnin B and Dolastatins etc are getting popularity due to their potent action. Bryostatins are a group of macrolide lactones, first isolated in the 1960s are potent modulators of protein kinase C [7]. In in vitro tests, Bryostatin 1 was able to inhibit cell growth, angiogenesis and caused excitation of cell differentiation and apoptosis. Bryostatin also shows immunomodulatory properties. Therefore, it is in use for dermal care and skin protection from harmful UV-B radiation.

Didemnins are cyclic depsipeptide compounds, isolated from a tunicate (sea-squirt) of the genus Tridemnum (family of Didemnidae), that were collected in the Caribbean Sea. It is a strong antiviral agent against both DNA and RNA viruses such as herpes simplex virus type 1, a potent immunosuppressant which exhibits some key role in skin graft [8-9].

Another important chemical agents from marine sources are Dolastatins. Dolastatins are isolated from from the marine cyanobacterium Symploca sp. The Dolastatins are mitotic inhibitors. They inhibits microtubule assembly by interfering with tubulin formation and thereby disrupt cell division by mitosis and induces apoptosis and Bcl-2 phosphorylation in several malignant cell types. Therefore, Dolastatins are used in dermal care products with anticancer property [10-11].

Among water algae species, Chlorella Vulgaris and Chlorella Pyrenoidosa are being used as dietary supplement for beautification of skin and for hair care. Chlorella was one of the first green algae, which became a dietary supplement. These green algae are rich in protein, amino acids, vitamins and minerals. When taken in diet, they assist to maintain healthy digestion and healthy skin [12-14].

Traditionally, algae are known to have effective anti-ageing properties especially when combination of algae extracts are in use. Sea algaes are considered good for the skin because they have chemical compositions, which are similar to human body's plasma, which enables particularly good penetration of the nutrients [15-17].

In Asia and some other part of world, apart from algae, another popular product named as marine collagen, derived from fish scales is getting large success in dermal care products. In fact, due to low to optimum molecular weight of fish (marine) collagen, it is up to 1.5 times more easily absorbed than bovine, porcine or chicken collagen [18]. Researchers have suggested that fish (marine) collagen is also the right type of collagen (Type I& II) which is required for the building blocks of our skin. As marine collagen is extracted from fish, it is free from Bovine Spongiform Encephalopathy [19].

Collagen and collagen peptides are used as potent cosmetic ingredient as it has already shown in preclinical studies to improve skin barrier function, to induce the synthesis of further collagen and hyaluronic acid, and to promote fibroblast growth. From the sea fish, it is possible to obtain type I and type II collagen from bone, cartilage and muscle of fish. In order to isolate the different type of collagen from fish, recent technologies and latest procedures ar being used. Size reduction of skins, scales, fins and fish bones is required to facilitate acid action. The common method to remove non-collagenous proteins is the use of sodium hydroxide [20]. Numbers of beauty care product industries viz. La Prairie (Beiersdorf) and Crème de la Mer (Estée Lauder) have started to sell global product by incorporating marine collagen and pro-collagen containing dermal care creams.

New category of marine ingredients for dermal care includes organic seaweed extract and Dead Sea salts. Seawater is known to have all of the elements of life and has been chemically similar to blood plasma, lymph and the fluids that make up 70% of the human body. Marine plants, which obtain their nutrients from seawater, are concentrated storehouses of all of the elements found in the sea [21]. Topical application of seaweed extracts containing polysaccharide is well known to thicken the skin's dermis with the result that the appearance of wrinkles was diminished due to the uplifting effect and causes dermal rejuvenation. Apart from this, bath in seaweed provides vital elements such as magnesium, potassium, iodine, copper and zinc essential, which plays key role in the synthesis of collagen and other skin fibers [22-23].

Marine polysaccharides from seaweed are natural moisturizer, which makes skin smooth and firm to the touch. These saccharides reduce inflammation and lock in moisture. Seaweed is also the richest source of antioxidants. When applied to the skin, they offer us an Eco-Protective Shield against environmental aging factors. The most common molecular classes of compounds used in the dermal care is the exopolyssacharides (EPS) [24]. Various cyanobacteria, proteobacteria and archaea produce EPS and this can be isolated from water column and animals, etc.

Marine algae are considered as source of carotenoids from beta-carotene, lycopene and lutein to astaxanthin, zeaxanthin and polyphenols. Calcium and magnesium found in seaweed are useful in helping the body to get rid from toxins [25].

Microorganisms such as marine cyanobacteria, marine fungi, and several other groups of marine bacteria are very important for dermal care because of their biological and habitat diversity, which resulted in the capacity to produce beneficial metabolites. The extracellular extract from the Caribbean sea whip (gorgonian) Pseudopterogorgia elisabethae, is mainly composed by pseudopterosins, which are tricyclic diterpene glycosides [26]. This diterpene glycoside is potent anti-inflammatory and analgesic agents, which inhibit eicosanoid biosynthesis by inhibition of both phospholipase A2 (PLA2) and 5-lipoxygenase. Now days, Cosmetic industries are using pseudopterosins in skin creams as topical anti-inflammatory agents. The present article summarizes various key ingredients from marine origin, which plays or may play in future, a vital role in dermal care.

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