

Commentary on “Marine algae as attractive source to skin care”

Jean-Yves Berthon Dr¹, Rachida Nachat-Kappes Dr¹, Matthieu Bey Dr¹, Jean-Paul Cadoret Dr¹ and Edith Filaire Pr^{2,3,4}

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Recently in *Free Radical Research* Berthon et al. (1) published an article describing the interest of Marine Algae regarding their beneficial effects on skin health.

As Berthon et al. (1) points out, the cosmetics industry has focused in recent years on bioactive substances derived from natural products such as plants, microbial metabolites, mushrooms and marine algae. This attention is due to the presence of compounds with anti-bacterial, anti-tumor and anti-oxidative properties.

Focusing specifically on marine algae, also known as macroalgae or seaweed, it appears they are rich in compounds such as polysaccharides, carotenoid, sterol, phlorotannins, terpenoids, fatty acids, as well as mineral and vitamins (2). Macroalgae represent a large multicellular polyphyletic group of photosynthetic eukaryotic organisms. The main groups include green algae (division Chlorophyta), brown algae (division Phaeophyta) and red algae (division Rhodophyta). Some investigators also include prokaryotic blue-green algae (phylum Cyanobacteria), which are excluded from this review. Marine macroalgae are quite dominant in polar, temperal, and tropical waters. Many algae metabolites and pigments have antioxidant, anti-inflammatory, anti-diabetic, antitumor, antihypertensive, and anti-allergic properties, as well as some role in hyaluronidase enzyme inhibition, neuroprotection and in matrix metalloproteinase (MMPs) inhibition activity. In addition, marine algae-derived compounds have been recently given much importance in cosmeceutical product development. In the following lines topics for which marine algae can be interesting in the skin care issue will be presented.

Skin aging is a slow and complex process including intrinsic and extrinsic mechanisms inducing many changes such as thinning, dryness, laxity, fragility, enlarged pores, fine lines and wrinkles. It has been shown that progerin accumulates over time as the skin ages, and works with telomeres to trigger cellular senescence in normal human fibroblasts. It seems that extract from *Alaria esculenta* induce a significant decrease in progerin in aged fibroblasts.

Extrinsic aging is also referred to as photoaging. Several compounds such as shinorine, mycosporine-glycine, fucoxanthin, eckol, eckstolonol from different algae can absorb UV-A and UV-B and some of them can scavenge the arisen Reactive Oxygen Species (ROS), exhibiting thus photo-protecting functions. Thus, in addition to vitamins and plant extracts, compounds derived from algae also have anti-oxidative properties and can be applied.

Marine algae have also the ability to kill fungi and bad bacteria, maintaining skin flora in state of balance, the antimicrobial properties of seaweeds being well-documented in recent years. The pathogenesis of acne is multifactorial, among them, bacteria contribute to this disease. Some compounds extracts were identified for their anti-bacterial activity against skin bacteria, such as *Propionibacterium acnes* and *S aureus*, involving in acne formation (3). More precisely, it has been shown that compounds such as Sargafuran, Ecklonia cava and Ishige sinicola might be useful as a lead compound to develop new types of anti-*P. acnes* substances and new skin care cosmetics to prevent or

improve acne (4,5). Moreover, extracts from some macro algae exhibit anti-inflammatory effects and are able to modulate the levels of growth factors and collagen, which could improve the acne skin condition and speed up skin repair.

Public interest in skin whitening cosmetics is increasing notably. Skin whitening refers to the use of natural or synthetic substances that provide an even pigmentation by reducing the melanin concentration in the skin. The use of tyrosinase inhibitors is the most common approach for skin whitening, as the enzyme catalyzes the rate-limiting step of pigmentation. Numerous natural compounds from marine organisms (*Ecklonia cava* and *Sargassum siliquastrum*) have already been employed as skin whiteners and in particular as tyrosinase inhibitors, such as eckol, dieckol and fucoxanthin. As suggested by Corinaldesi et al. (2) skin-whitening compounds used in cosmetic products are mostly extracted from terrestrial organisms although the huge number of marine skin whitening molecules offers new opportunities for the cosmetic market.

CONCLUSION

Generally speaking, the application of marine algae in dermatology treatment is of huge potential due to their properties of anti-acne, antioxidant, anti-aging, anti-inflammatory, melanogenesis inhibition, UV photo protective and anti-melanoma effects. The effectiveness of marine algae compounds in proper downregulation of MMPs, tyrosinase inhibitor activity and related pathological effects has been the topic of a lot of investigations. Scientists have shown that marine algae derived compounds exhibit various beneficial activities on skin health and care. It seems that brown algae-derived phlorotannins and sulfated polysaccharides will be playing a major role in the cosmeceutical production development of the future. The proper development and isolation of bioactive compounds from algae will be undoubtedly helpful in cosmeceutical product development.

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¹Societe GREENTECH SA, Biopole Clermont-Limagne, Saint-Beauzire, France, ²CIAMS, Universite Paris Sud, Universite Paris-Saclay, Orsay Cedex, France, ³CIAMS, Universite d'Orleans, Orleans, France, ⁴INRA, UNH, Unite de Nutrition Humaine, CRNH Auvergne, Universite Clermont Auvergne, Clermont-Ferrand, France

Correspondence: Edith Filaire Professor, Universite Orleans, Pôle STAPS, 2 allée du château, 45067 Orleans, France. Telephone 0033648035198, e-mail edith.filaire@univ-orleans.fr

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