The science of cosmeceuticals is evolving rapidly, having made tremendous advancements in the past decade. We have thousands of synthetic and naturally occurring compounds from which to choose. When we create products, the aim is to create that perfect cocktail of actives that will lead to optimal benefits. A fantastic product that delivers fast results does not necessarily contain a huge ingredient deck but rather a carefully selected group of scientifically and clinically sound compounds that work synergistically to yield outstanding results.

Many of the most effective ingredients found in skincare formulations today come from the natural gifts of Mother Nature. Marine compounds, when carefully extracted and purified, are transformed into natural and efficacious ingredients.

Today’s scientists aren’t the first to discover the natural healing power of marine macroalgae, more commonly known as seaweed. Since ancient times, long before the advent of modern medicine, actives from marine algae have been used for treating various ailments. In Asia, extracts from macroalgae have been used for centuries to brighten the complexion and protect the skin from sun damage. Another fantastic example of a diverse clinical application is seen in the Indian subcontinent, where Ayurvedic medicine uses macroalgae extracts to fight off skin infections caused by various pathogenic organisms.

**Effects of Aging and Preventative Processes**

Scientific analysis and data suggests that macroalgae extracts not only exhibit extensive skin healing properties but contain substances that may reverse extrinsic aging by influencing the meditators of inflammation - the root cause of photodamage. Photodamage is the structural deterioration of the skin due to over-exposure to the sun which leads to extrinsic aging.

Extrinsic aging is reversible if the right measures are taken proactively. While results vary depending on the age when skincare commences, with continuous and regular usage, positive outcomes can be expected. Proper skincare practices, a healthy lifestyle, an anti-inflammatory diet and sun safety are cornerstones in managing the effects of photodamage. It is these proactive measures along with the use of evidence-based products that ensure a healthy complexion for years to come.

To understand the role of macroalgae in the preventative process of aging, we must first understand the pathophysiology of extrinsic aging itself on a deeper level.
Let's look at the top pathognomonic physical signs of extrinsic aging:

- **Rhytids** (wrinkles of varying degrees) - *indicating collagen loss*
- **An uneven and blotchy complexion** - *pigmentary changes*
- **Laxity** - *collapse of dermal infrastructure*
- **Leathery, dry and lacklustre skin** - *decrease in ceramides, Natural Moisturizing Factors (NMF’s) and skin barrier abnormalities*
- **Vascular changes such as redness/flushing** - *damaged/inflamed microvasculature*
- **Enlarged facial pores** - *damage to sweat glands*
- **Lipoatrophy** - *damaged or thinning of hypodermis containing fat tissue*

Here is a snapshot of events on a microscopic (both histological, molecular and biochemical) level that occur every time our skin is exposed to harmful external environmental triggers such as smoking, pollution, UV radiation, and stress.

1. Generation of **Reactive Oxygen Species** (ROS) also known as free radicals. Free radicals are extremely destructive and result in genetic mutations that cause collagen degradation translating physically into weathered and wrinkled skin.
2. Accumulation of abnormal masses of tangled and mechanically inert elastic fibers in the dermis of the skin. This ineffective mass will slowly replace the important collagen and ground substance of the skin that is responsible for turgor and resilience.
3. Low grade inflammation around blood vessels of the skin. This chronic inflammation will set off a continuous cycle of detrimental biochemical processes that will result in eventual damage of vital components of both the epidermis and dermis.
4. Accumulation of Mast cells along with other cells of inflammation that release destructive proteolytic enzymes.
5. Sustained levels of UV radiation results in increased levels of collagen degrading enzymes known as Matrix Metalloproteinases (MMP’s) by triggering cytokine and growth factor induction on the surface of keratinocytes.
6. Impaired repair functions. The skin’s innate capability of repairing itself and regenerating is greatly reduced, hence the processes of aging continue unchecked.
7. Damaged proteasomal complex. A vital system of molecules that is essential in removing oxidized proteins from the dermal matrix. If oxidized proteins are allowed to accumulate, the eventual collapse of the dermal infrastructure results in severely photodamaged skin.

**The Role of Marine Macroalgae**

Now that we’ve understood the simplified version of extrinsic aging, let’s examine why marine macroalgae undoubtedly remains the most valuable and efficacious ingredients of choice to use in skincare products.

1. Extracts from macroalgae have been shown to significantly reduce levels of destructive MMP’s.
2. Compounds isolated from macroalgae are potent ROS scavengers that also exhibit cellular and DNA protective abilities.

3. Macroalgae can prevent sun spots and uneven skin tones. Extracts have innate skin lightening properties through tyrosine inhibition, making them ideal candidates for natural skin brightening formulations.

4. Macroalgae reduce the mediators of inflammation such as pro-cytokines and growth factors.

5. Macroalgae extracts have the potential to promote healthy skin immune functions thereby reducing the incidence of dermatitis and other histamine related skin issues.

6. Macroalgae extracts also have the ability to restore and fortify the barrier function by preventing the colonization of harmful bacteria, viruses and fungi.

7. Macroalgae contain bioactive compounds that have demonstrated anti-tumor, anti-viral, and anti-inflammatory properties.

8. Marine macroalgae have demonstrated photo-protective abilities. The unique biochemical compounds greatly reduce UV-A induced oxidative stress. This innate sun protective ability makes them ideal candidates for natural sunscreen formulations.

Macroalgae extracts contain totally unique bioactive compounds that cannot be found in any other naturally occurring substance. Rich in phlorotannins, astaxanthin, and sulfated polysaccharides, along with a host of vitamins, essential fatty acids, proteins, enzymes, hormones, minerals and trace elements, macroalgae when harnessed sustainably, and manufactured responsibly, yield active ingredients that have a huge positive impact on the condition of the skin. In fact, macroalgae is the only natural known marine plant species that demonstrates such a diverse spectrum of beneficial actions on the skin.

This marvelous and miraculous oceanic plant is indeed one of the most efficacious ingredients for high-end skin care. The future for macroalgae based products is not only promising but highly anticipated as more and more people are going back to Mother Nature to look for healthful solutions and truth in healing.

About Dr. Noor

Dr. Ansl Noor has always believed in public health education and the age-old philosophy that ‘prevention is better than the cure.’ These beliefs have left an acute mark upon her conscience since her early days of training as a medical physician. After completing her formal education as a medical doctor, she completed her Post Graduate Degree (MSc) in Dermatological Sciences successfully from the prestigious Welsh Institute of Dermatology (UK), known for their pioneering work in the science of Dermatology and Genetic Dermatology. Her research work also includes the history and evolution of Pox Viruses and the Clinical Applications of IPL – A Comparative Study.

Her main interests are Laser Dermatology, non-invasive IPL systems and holistic skin care. She has lectured at various medical institutions and her thesis has received wide acclaim for its bold new look at the future of non-invasive light based technology in the treatment of skin diseases, cosmetic defects and
other novel applications. Her book, *Skin Sensibility - A New Approach to Skincare* has received rave reviews and is a simple and practical guide to maintaining your skin health proactively.

Please visit her website at [http://cuticonscious.com](http://cuticonscious.com).

**About Ocean Rescue Spa Products**

Ocean Rescue’s premium spa products are based on decades of research specifically designed to bring the benefits of the unique properties of seaweed and other marine-based ingredients to individuals and professionals seeking natural solutions to skin care. The sea is an active element in all Ocean Rescue products - not just merely additives to our proprietary formulas.

For links to similar papers used to research this article, and to other ocean and marine-based white papers, including *The World of Algae*, please visit [https://oceanrescuespa.com/research](https://oceanrescuespa.com/research)

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