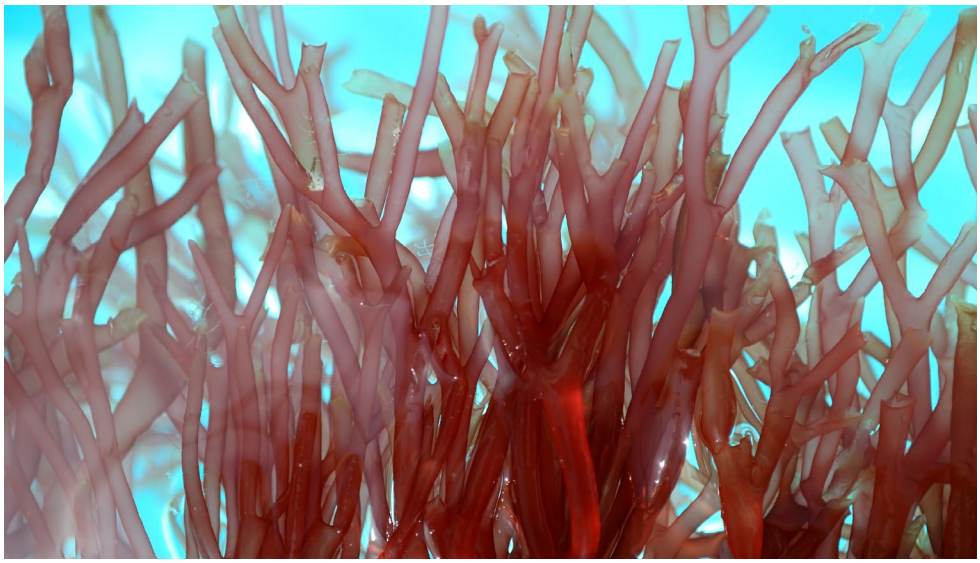
BiEau® Actif Red Algae



bioactive botanical waters
isotonic harmonization
natural
sustainable
fights inflammaging
refreshing
precious cellular essence

BACKGROUND

Plants naturally utilize and bind water in their cells as a mechanism of survival. This cellular water or plant essence offers the ability to harness a nutritional, isotonic solution capable of nourishing the skin and hair in personal care applications. **BiEau® Actif** botanical waters combine advancements in sustainable beauty and leading edge science to provide brands essential ingredients to support their unique aspirations. Innovative development of botanical waters promote the natural balance of the skin, scalp, and hair while utilizing natural plant properties to work in conjunction with the skin.

Botanical waters offer brand-differentiating properties including unique origin stories, sustainability appreciation, and efficacious beauty benefits that work with your hair and skin care for a healthy complexion. From cultured algal and mushroom cells to reanimated agricultural waste, Active Concepts maximizes raw material sourcing and creation for minimal environmental impact with the development of our **BiEau® Actif** botanical waters line.

BiEau® Actif Red Algae is the sustainably sourced essence of *Haematococcus pluvialis* and fermented *Phaffia rhodozyma* designed to encourage an isotonic environment while reducing inflammation to combat problem skin and aging induced by inflammation. *Phaffia rhodozyma* and *Haematococcus pluvialis* are known as the major prom3inent microorganisms able to synthesize the carotenoid astaxanthin. Carotenoids are pigments responsible for bright red, yellow and orange hues in many plants and play an important role in plant health. Astaxanthin, specifically, is known to improve skin health and reduce inflammation. **BiEau® Actif Red Algae** utilizes a novel approach to sustainability while capitalizing on the presence of astaxanthin, from red algae and fermented yeast, to rejuvenate the complexion with potent anti-inflammatory benefits.

Code Number: 16909

INCI Name: Haematococcus Pluvialis Extract & Yeast Ferment Extract
INCI Status: Conforms
REACH Status: Compliant
CAS Number: 999999-99-4 & N/A
EINECS Number: 310-127-6 & N/A

Origin: Botanical and Yeast
Processing:
GMO Free
No Ethoxylation
No Irradiation
No Sulphonation
Additives:
Natural Antimicrobial: Lactobacillus Ferment
Preservatives: None
Antioxidants: None
Other additives: None
Solvents Used: N/A
Appearance: Orange to Red, Slightly Viscous Liquid
Soluble/ Miscible: Water Soluble
Microbial Count: < 100CFU/g, No Pathogens

Suggested Use Levels: 1.0 – 10.0%
Suggested Applications:
Anti-Inflammation

Benefits of **BiEau® Actif Red Algae**:

- Decreases Inflammation
- Sustainably Manufactured

BiEau® Actif Red Algae

BiEau® Actif Red Algae utilizes cellular plant essence to deliver isotonic nutrients and harmonize skin and hair. Skin is the largest organ of the body and is nutrients and harmonize skin and hair. Skin is the largest organ of the body and is composed of approximately 60% water. As a protective barrier, the skin is our best defense against external aggressors. However, the skin's permeability can be influenced by a variety of environmental attributes including pollution particles, cosmetic actives, temperature fluctuations, and water exchange. A delicate balance exists between water introduced onto our skin, using cosmetics, cleansers etc, and the water present in our skin and cells. Water exchange occurs through the cell membrane through the process of osmosis. Deionized or demineralized water can be traditionally used in the creation of cosmetic ingredients, but this water typically lacks minerals and natural components that our skin craves. Isotonic solutions offer an environment most beneficial and least disruptive to skin cells while enhancing affinity with the skin due to a mineral content close to that of skin cells. Isotonic materials maintain the size, shape, and integrity of skin cells. Some cosmetic solutions are hypotonic or hypertonic and can damage skin cells by drawing out cellular water, thereby drying out the skin, or even forcing water into the cells and causing cell deformation. Isotonic solutions maintain a natural environment and healthy balance for the skin and hair.

SCIENCE

Algae embodies the concept of marine sourced sustainability promoting utilization in various industries as food, biofuels, filtering materials, soil fertilizer, pharmaceuticals and laboratory growth media. Grown in house, cultured algae cells diminish the demand for algae harvesting while allowing the manufacture of various algae ingredients including algae botanical waters. The renewable nature of algae prompts their incorporation into beauty applications across skin, hair, and body care formulations. As a powerhouse of natural nutrients, vitamins, and minerals algae actives maintain the cutting edge of innovation in the cosmetic market.

Algae absorbs water and nutrients in their cells, directly from the surrounding water. Depending on the species, fresh algae are 70-90 percent water by weight.[1] This internal cellular water contains an abundance of biologically active components and is often disregarded in the extraction of algal lipids for biofuel. Active Concepts has utilized solar energy to effectively evaporate and isolate the nutrient-rich water of *Haematococcus pluvialis* and combine this precious essence with fermented *Phaffia rhodozyma* to produce a bioactive cellular water complex capable of fighting skin inflammation.

Haematococcus pluvialis is prominent species of red algae known as major sources of natural astaxanthin.[2] Based on their unique environments, these red algae have evolved with robust mechanism to reproduce and survive under extreme conditions such as pollution, UV radiation and high temperatures. Various compounds produced by red algae, including astaxanthin, have been used as anti-inflammatory agents in supplements and medicine.[3] The potent anti-inflammatory properties of astaxanthin help prevent inflammaging.

BENEFITS

BiEau® Actif Red Algae is a cellular water complex capable of offering anti-inflammatory properties. **BiEau® Actif Red Algae** utilizes a novel approach to eco-conscious cosmetic active development while capitalizing on the presence of astaxanthin to defend against inflammation and promote an overall healthy complexion. **BiEau® Actif Red Algae** can be used in a variety of cosmetic and personal care formulations aimed to nourish and calm while encouraging an isotonic environment beneficial for optimal health of the skin.

BiEau® Actif Red Algae

EFFICACY

An *in-vitro*, interleukin-6 ELISA assay was conducted to assess the changes in IL-6 levels in cultured human dermal fibroblasts treated with **BiEau® Actif Red Algae**. Interleukin-6 is a proinflammatory cytokine known to play an active role in inflammation, immunology, bone metabolism, reproduction, arthritis, neoplasia, and aging. IL-6 signals through the nuclear factor-kappa B pathway that results in the transcription of inflammatory mediators, including matrix metalloproteinase-1 (MMP-1). MMP's are responsible for breaking down the extracellular matrix and collagen in the skin leading to wrinkles, fine lines, and loss of skin elasticity. Reducing the level of IL-6 and other inflammatory mediators is believed to slow down degradation of the skin matrix and, possibly, stimulate its replenishment.

As shown in Figure 1, results indicate **BiEau® Actif Red Algae** exhibited anti-inflammatory effects on LPS-treated fibroblasts utilizing various concentrations of **BiEau® Actif Red Algae** including 1%, 0.1%, 0.01%. This decrease in IL-6 production indicates a reduced inflammatory environment, which could decrease the signs of aging and reduce the formation of fine lines and wrinkles. This study indicates, at normal use concentrations, **BiEau® Actif Red Algae** enhances soothing and anti-aging properties.

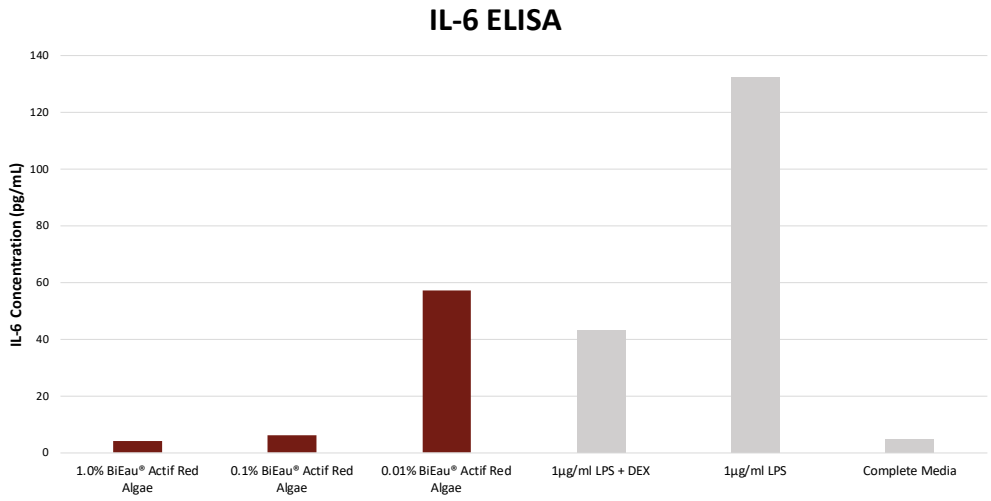


Figure 1. Anti-inflammatory properties.

An Osmotic Cell Pressure Membrane study was performed to evaluate how cellular water or plant essence offers the ability to harness a nutritional, isotonic solution capable of nourishing the skin and hair in personal care applications. Human dermal keratinocytes were seeded into 24-well tissue culture plates and allowed to grow to confluency in complete media. The complete media was removed and either 100% Deionized Water or 100% **BiEau® Actif Red Algae** was added to the respective test well. Set to a 40x magnification, images were taken at time zero and every 5 minutes all the way up to the final 45 minute time mark. Crystal Violet Stain was used for enhanced microscopy imaging and a final stain image was taken of the test well.

As demonstrated in Figure 2, nature constantly tends to maintain balance. In the presence of a hypotonic deionized water solution, the deionized water will penetrate the skin cells to balance out the differences in concentration on either side of the membrane. Skin cells then swell due to the water pressure on the cell walls. The internal cellular water of the plants used in the production of our **BiEau® Actif** product line harnesses a nutritional, isotonic solution capable of supporting the skin's natural environment and promotes cellular balance. The skin cells remain in a natural environment and their morphology and integrity remain unaltered.

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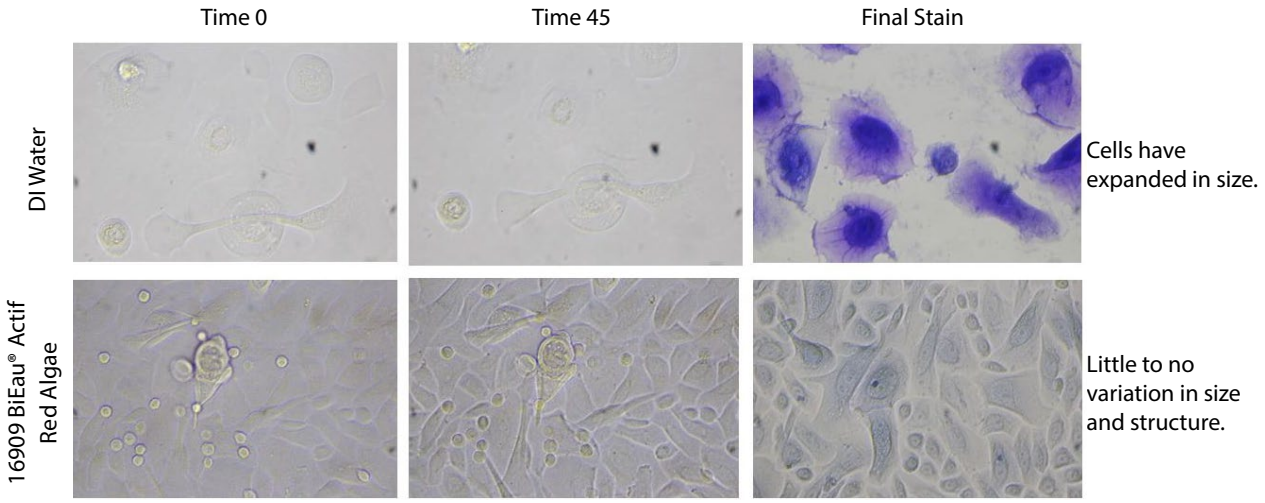

Figure 2. Cell Images.

*Please note that due to the post treatment fixation and staining, the plate was removed from the microscope to complete the process. Final stain images were taken of the exact same treatment culture well, though the individual cells captured may vary from the original images.

References:

1. Siti Zullaikah. Ecofuel conversion technology of inedible lipid feedstocks to renewable fuel. Advances in Eco-Fuels for a Sustainable Environment, 2019
2. Domínguez-Bocanegra AR, Ponce-Noyola T, Torres-Muñoz JA. Astaxanthin production by Phaffia rhodozyma and Haematococcus pluvialis: a comparative study. Appl Microbiol Biotechnol. 2007 Jun;75(4):783-91.
3. Sergio Davinelli, Michael E. Nielsen, and Giovanni Scapagnini. Astaxanthin in Skin Health, Repair, and Disease: A Comprehensive Review. Nutrients 2018, 10, 522; doi:10.3390/nu10040522

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