

BiEau® Actif Birch



sustainable
Nourishing
cellular plant essence
isotonic solution
Antioxidant
Conditioning

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 Birch is a vital botanical essence sustainably sourced from *Betula alba*, designed to encourage an isotonic environment while promoting antioxidant protection for the skin. *Betula alba*, also known as the White Birch, is commonly utilized to optimize skin health and is recognized as an abundant source of nutrients including succinic acid. Natural acids such as succinic acid are vital components typically involved in cellular metabolism and provide protection against free radical damage. **BiEau® Actif Birch** utilizes a novel approach to sustainability while capitalizing on the presence of succinic acid, from *Betula alba*, to offer antioxidant properties and promote a rejuvenated complexion for the skin and hair.

BiEau® Actif Birch utilizes cellular plant essence to deliver isotonic 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.

Code Number: 16907

INCI Name: Betula Alba Leaf Juice

INCI Status: Approved

REACH Status: Complies

CAS Number: 84012-15-7

EINECS Number: 281-660-9

Origin: Botanical

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: Clear to Hazy, Pale
Yellow to Amber Liquid

Soluble/ Miscible: Water Soluble
95.7% Biodegradability

Microbial Count: <100 CFU/g,
No Pathogens

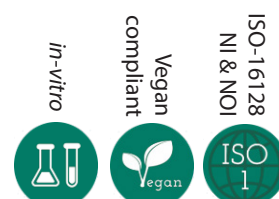
Suggested Use Levels: 1.0 -10.0%

Suggested Applications:

Antioxidant, Isotonic
Solution, Nourishing

Benefits of BiEau® Actif Birch:

- Antioxidant
- Isotonic Solution
- Rejuvenating



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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.

SCIENCE

Agricultural byproducts achieve new life in the beauty industry as components traditionally considered unwanted give rise to innovation. Birch trees offer untapped potential as potent sources of amino acids, vitamins, minerals, antioxidants, proteins, and enzymes. Harvesting birch tree bark, sap, or leaves offers an opportunity to maximize the properties of birch without harming the overall integrity of the tree. Many industrial applications of birch trees do not always involve the use of the bark, sap, or leaves but the tree's lightweight, flexible, and waterproof nature encourage an extensive scope of possibility. Sustainable collection and utilization of birch material minimizes our carbon footprint, while offering the opportunity for brand differentiation. As a powerhouse of natural nutrients, vitamins, and minerals birch actives maintain the cutting edge of innovation in the cosmetic market.

Cellular water is the living energy for plant survival. Nutrient transport, structure, growth, and even chemical processes such as photosynthesis rely on water functionality. The journey of the energizing liquid originates in the roots of the birch as the tree naturally draws water from the soil. Each year, birch trees store nutrients during the winter to regenerate blossoms and overall growth during the spring. As the water travels throughout the tree, via the vascular tissue, the plant circulates minerals and nutrients while transporting vital material to the leaves and blossoms. Active Concepts has utilized solar energy to effectively evaporate and isolate the nutrient-rich water of *Betula alba* leaves to produce a bioactive cellular water capable of providing antioxidant protection.

Betula alba maintains a unique blend of enzymes, amino acids, and natural acids including succinic acid. Naturally occurring, succinic acid commonly resides in various fruits, botanicals, and animal tissues and plays an essential role in metabolism, particularly in the Krebs or citric acid cycle. Cells utilize this cycle to generate energy during respiration. Succinic acid is an intermediate in the cycle and is capable of donating electrons to the electron transport chain. Intermediates in the cycle protect against oxidative stress by modulating reactive oxygen species, providing antioxidant benefits for the skin.

Antioxidants are powerful free radical scavengers working to protect and reduce potential damage to cells. Reactive oxygen species, ROS, can modify DNA resulting in cellular damage and in regards to skin care contribute to fine lines, wrinkles, and accelerated signs of aging. Antioxidants assist to reduce negative effects of exogenous sources of ROS including environmental pollution and photo aging while also targeting endogenous sources such as biochemical reactions in cells. Topical application of succinic acid ingredients demonstrates the ability to provide antioxidant protection.

BENEFITS

BiEau® Actif Birch is a vital botanical essence capable of offering antioxidant protection. **BiEau® Actif Birch** utilizes a novel approach to eco-conscious cosmetic active development while capitalizing on the presence of succinic acid to promote an overall healthy complexion. **BiEau® Actif Birch** can be used in a variety of cosmetic and personal care formulations aimed to nourish and rejuvenate while encouraging an isotonic environment beneficial for optimal health of the skin and hair.

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EFFICACY

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 Birch** 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 1, 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.

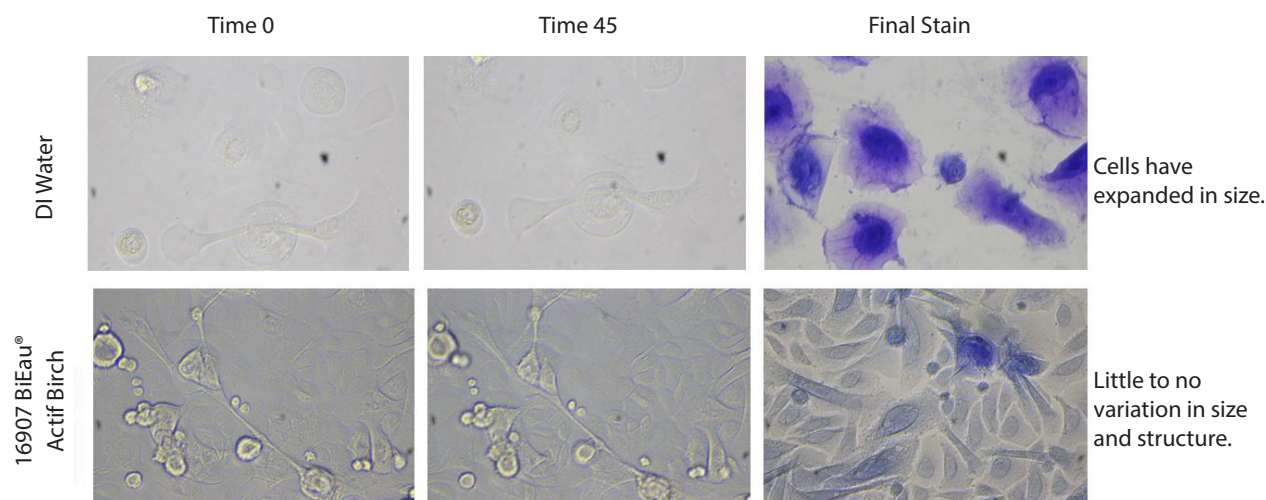


Figure 1. Cell Images.

*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.

An *in-vitro* Oxygen Radical Absorbance Capacity (ORAC) assay was conducted to assess the antioxidant capacity of **BiEau® Actif Birch**. Reactive oxygen species (ROS) are generated by normal cellular processes, environmental stresses, and UV irradiation. ROS are dangerous to cellular structures and functional molecules (i.e DNA, proteins, lipids) as they act as strong oxidizing agents or free radicals. The ORAC assay is a standard method used to assess antioxidant capacity of physiological fluids, foods, beverages, and natural products. The assay quantitatively measures a sample's ability to quench free radicals that have the potential to react with and damage cellular components.

Figure 2 displays the ability of **BiEau® Actif Birch** to exhibit greater antioxidant activity than 200µM Trolox®. The antioxidant capacity of **BiEau® Actif Birch** increased as the concentration increased, therefore indicating that the ability to minimize oxidative stress is dose dependent. This study concludes that **BiEau® Actif Birch** is capable of providing antioxidant properties and aids in the anti-aging process offering protection at the cellular level.

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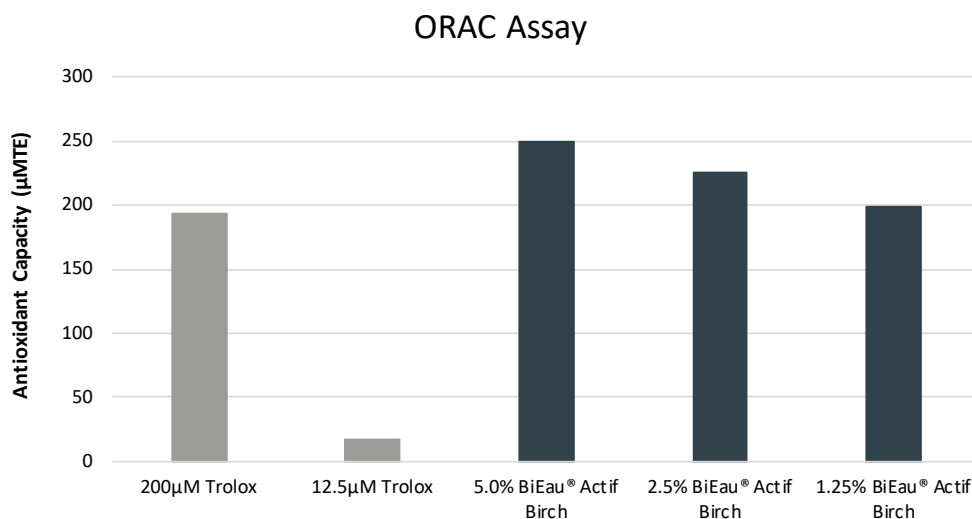


Figure 2. Antioxidant capacity of **BiEau® Actif Birch**

References:

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2. Softa, M., Percoco, G., Lati, E. and Bony, P. (2019). Birch Sap (Betula alba) and Chaga Mushroom (Inonotus obliquus) Extracts Show Anti-Oxidant, Anti-Inflammatory and DNA Protection/Repair Activity In Vitro. *Journal of Cosmetics, Dermatological Sciences and Applications*, 09(02), pp.188-205.
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