Peptide Q10™ biofunctional

Reinventing Coenzyme Q10: The biological approach

Vincience Biofunctionals

ASHLAND®

With good chemistry great things happen.™

Bioengineered Anti-aging Peptide to Help Boost the Endogenous Synthesis of Coenzyme Q10 and Enhance the Skin's Natural Antioxidant Defense

Coenzyme Q10 (CoQ10) has long been recognized as an effective ingredient that helps consumers stay younger looking. This lipid-soluble component, synthesized naturally in the body and located in mitochondria and cell membranes, is critical to energy generation and acts as a powerful antioxidant to combat premature aging. Unfortunately, it has been evidenced that CoQ10 levels tend to diminish with aging (by as much as 75% in the epidermis for people between the ages of 30 and 80), handicapping cells in their antioxidant defenses and their ability to produce energy (ATP).

To counteract this decline, topical application of CoQ10 is commonly used in cosmetic products. Some studies suggest that external supply of CoQ10 may increase the CoQ10 level mostly in the sebum, which may not fully restore the CoQ10 balance in the epidermis.

With this in mind, Ashland Specialty Ingredients has bioengineered a peptide to help skin boost the natural endogenous synthesis of CoQ10. **Peptide Q10 biofunctional** is a novel strategy to counteract the age-related decline of CoQ10 and is a complementary and alternative technology to CoQ10 direct application. By "reinventing CoQ10" with a biological approach, Ashland's new technology represents a new shift in the anti-aging and antioxidant segment that can be used in conjunction, or not, with topical application of CoQ10.

Benefits

- **CoQ10 level:** Peptide Q10 biofunctional may help boost endogenous synthesis of CoQ10 (*in vitro*, *ex vivo*)
- **Antioxidant:** may help skin protect against free radicals (*in vitro*, *ex vivo*)
- **Energy:** may help boost ATP synthesis (*in vitro*)
- **Anti-aging:** helps diminish the appearance of wrinkles and fine lines (clinical study)

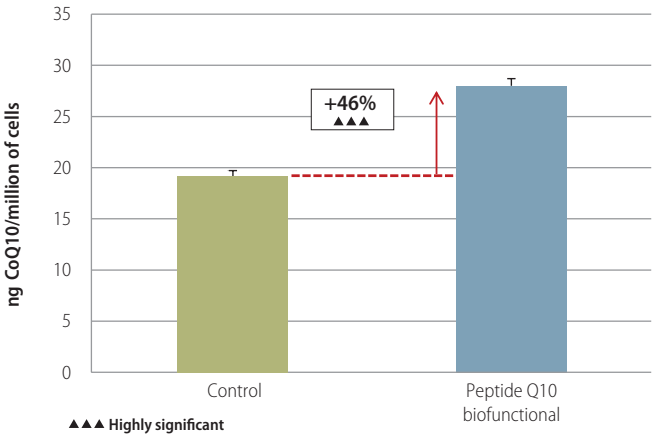
Cosmetic Applications

- Anti-aging formulations to help boost endogenous synthesis of CoQ10
- Innovative antioxidant formulations
- Formulations aiming to reduce appearance of wrinkles and fine lines
- Energizing formulations
- Daily protective skin care products

Endogenous Synthesis of CoQ10

Boosting the skin's own production of CoQ10 is a different and novel strategy from those used by cosmetics formulators using CoQ10 in topical application.

CoQ10 Presence In Vitro



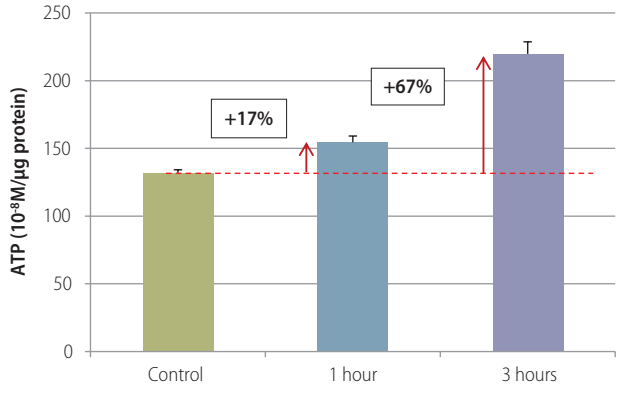
Cell culture: HaCat epidermal cells
Product application: Peptide Q10 biofunctional at 1%, 2 applications per day
Application time: 24 hours
Evaluation: HPLC assay (High Pressure Liquid Chromatography)

Through HPLC analysis of CoQ10, *in vitro* results suggest that Peptide Q10 biofunctional at 1% may help boost content of CoQ10 in cells.

Energizing Effects

Historically, CoQ10 has been known for its key role in mitochondrial bioenergetics and ATP (Adenosine Triphosphate) production.

Evaluation of ATP Presence In Vitro



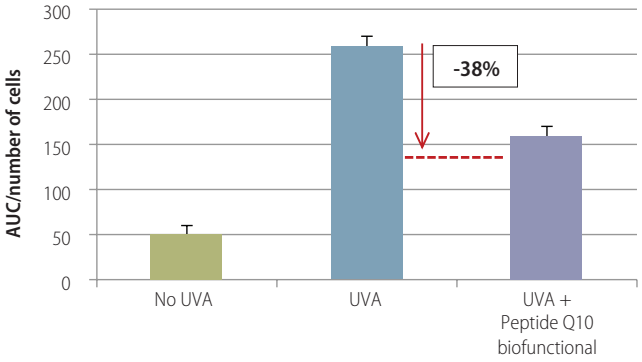
Cell culture: Fibroblasts
Product application: Peptide Q10 biofunctional (0.5%)
Application time: 1 and 3 hours
Evaluation: Luminometer assay

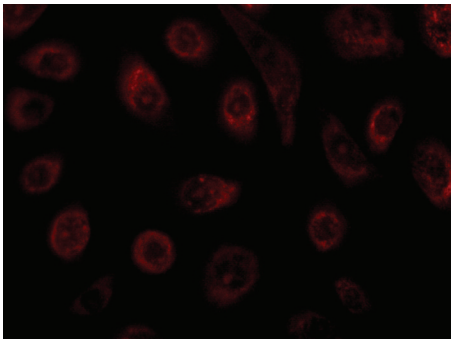
In vitro results suggest that treatment with Peptide Q10 biofunctional at 0.5% may help boost ATP production after 1 hour and 3 hours of application.

Antioxidant Power *In Vitro*

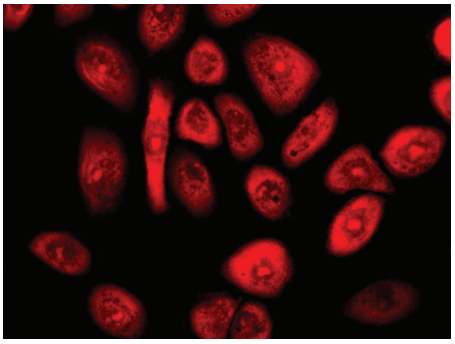
More recently, studies have demonstrated the presence of CoQ10 in other cellular fractions such as cell and organelle membranes, highlighting its major role as an endogenous antioxidant.

Evaluation of Free Radical Production (Superoxide O_2^-) In Vitro

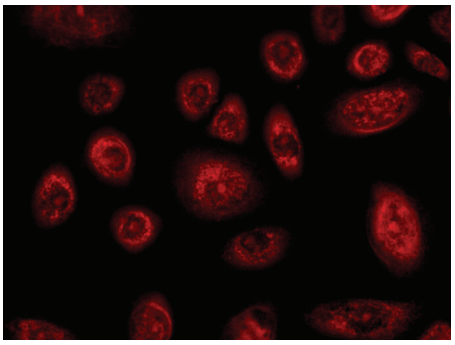




No UVA



UVA



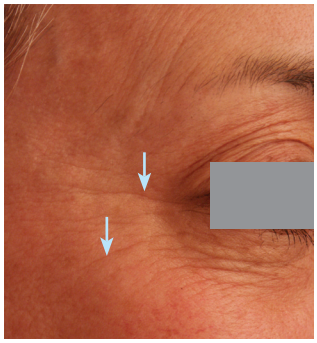
Peptide Q10 biofunctional + UVA

Cell culture: Normal human keratinocytes
Product application: Peptide Q10 biofunctional (0.5%)
Application time: Peptide Q10 biofunctional or control (24 hours) ➔ UVA (4 J/cm^2) ➔ incubation 1 hour 37°C ➔ Assay
Evaluation: MitoSox* Red

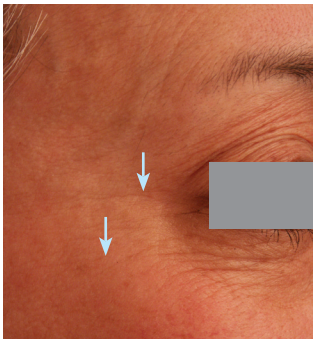
In vitro results suggest that under UVA stress, treatment with Peptide Q10 biofunctional at 0.5% may help limit the production of free radical superoxides compared to the control. Additional test results (not shown here) suggest similar results under UVB stress.

Anti-aging Visible Effect

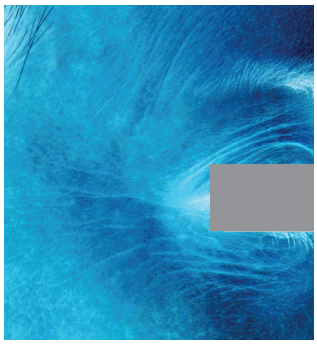
A double-blind clinical study against placebo was carried out to evaluate the visible effects of Peptide Q10 biofunctional. A panel of 10 women (ages 48 to 59) was studied following application of a placebo and a formulation containing Peptide Q10 biofunctional at 0.5% around their crow's feet area twice a day for 28 days. Quantilines* software measurement of roughness parameters on silicon replicas, clinical pictures and volunteer self-evaluation were used to determine the outcome. Results demonstrated that Peptide Q10 biofunctional mattered where it counts: visibly reducing the signs of aging.



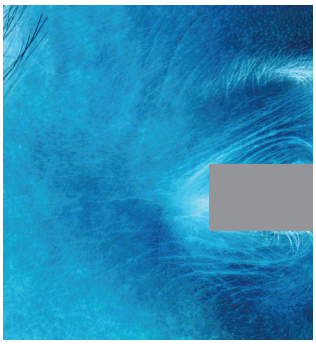
Day 0



Day 28 (with Peptide Q10 biofunctional)



Day 0



Day 28 (with Peptide Q10 biofunctional)

The photos above (illustrating most visible results) suggest a decrease in wrinkles and fine lines, suggesting a smoothing effect from the use of a cream containing Peptide Q10 biofunctional at 0.5%.

With Peptide Q10 biofunctional, skin care formulators can offer an innovative solution by adopting a new approach to boost the presence of natural endogenous C0Q10.

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RESPONSIBLE CARE®

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Specifications

Form: limpid solution
Color: colorless
Odor: characteristic
Preservative: sodium benzoate (0.5%)

INCI Name

Pentapeptide-34 Trifluoroacetate

Formulation Guidelines

– Water-soluble
– Add post emulsion, below 40°C
– Recommended use level: 0.5% to 1% (clinically tested at 0.5%)