

Intended use

Active for skin care

Benefits at a glance

- Amino acid derivative naturally occurring in the body.
- Enhances the skin cell's defense mechanism by increasing the cellular energy reservoir.
- Revitalization of cell energy metabolism:
 - Stimulates mitochondrial activity
 - Enhances cellular protein synthesis
- Supports skin protection.

INCI (PCPC name)

Creatine

Chemical and physical properties (not part of specifications)

Form	crystals
Water solubility	approx. 14 g/l (20 °C)
pH	approx. 7.4 (at 14.0 g/l, 20 °C)

Creatine is a natural amino acid derivative that has been shown to play an important role in cellular energy metabolism. Here it is involved in the transfer of ADP into ATP.

Known already from the second last century Creatine is well known as dietary supplement especially for athletes. At the beginning of the 2000's it found entry into the personal care market.

TEGO® Cosmo C 100, manufactured via a patented process, is the highest quality and purity creatine available on the market.

Efficacy Studies

Revitalizing of skin cells' energy metabolism

The physiological fatigue of skin evidenced by the early signs of aging is caused by stress and environmental influences. The consequence is a decrease of the energy amount stored in the cells followed by a suppressed capability to synthesize proteins such as collagen, elastin, and keratin. Additionally, cells experience increased oxidative stress as they age, increasing the amount of energy required for internal defenses. So, a well-working energy metabolism is essential for skin cells vitality. **TEGO® Cosmo C 100** is very effective at stimulating the cells energy metabolism.

The "cell energizing" effect of **TEGO® Cosmo C 100** was assessed in-vitro in a cell culture (Human keratinocytes, NHEK cells). A pre-screen cytotoxicity study was conducted using the Neutral Red assay, showing the non-cytotoxicity of **TEGO® Cosmo C 100**.

Keratinocytes were incubated with **TEGO® Cosmo C 100** for 24 hours at 37 °C. After this the cell vitality was measured with XTT, a water-soluble Formazan dye. The results are summarized in Fig. 1. The diagram indicates that the vitality of the cells treated with 0.01% **TEGO® Cosmo C 100** was about 60% higher than the control vehicle.

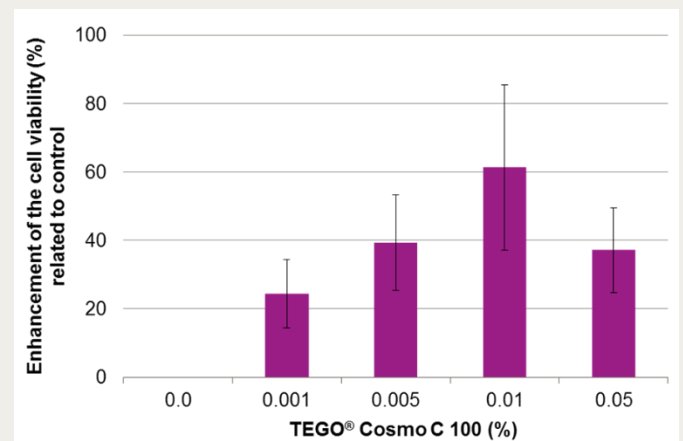
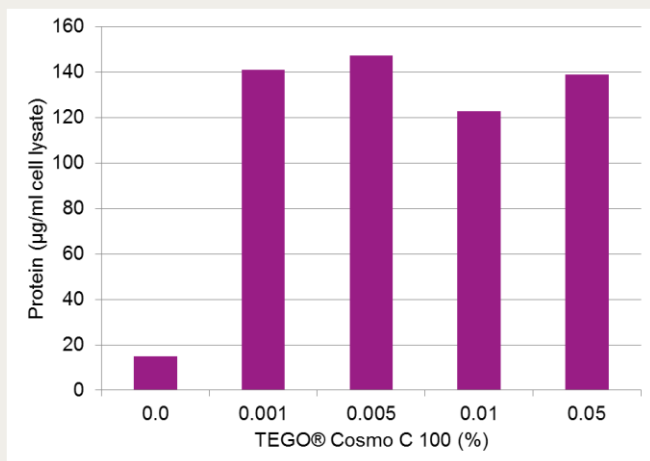


Fig. 1: "Cell energizing" test with keratinocytes

*Saturation of the cells with in vitro concentrations > 0.01%

The cell energizing effect of **TEGO® Cosmo C 100** causes an increase of the cellular protein content (Fig. 2). The effect was demonstrated after a 24 hours incubation with several concentrations of **TEGO® Cosmo C 100**. Keratinocytes were lysed followed by an analysis of protein amount (Method of Bradford).

Fig. 2: Protein assay of cell lysates



Because **TEGO® Cosmo C 100** stimulates both the mitochondrial activity and the protein synthesis of the skin, it provides long-term protection from premature aging and environmental stress, which is important for skin soothing and anti-aging formulations.

Membrane stabilization by TEGO® Cosmo 100

TEGO® Cosmo C 100 helps to ameliorate skin irritation from various environmental factors. A modified red blood cell (RBC) test was used to evaluate this effect on cell membrane stabilization.

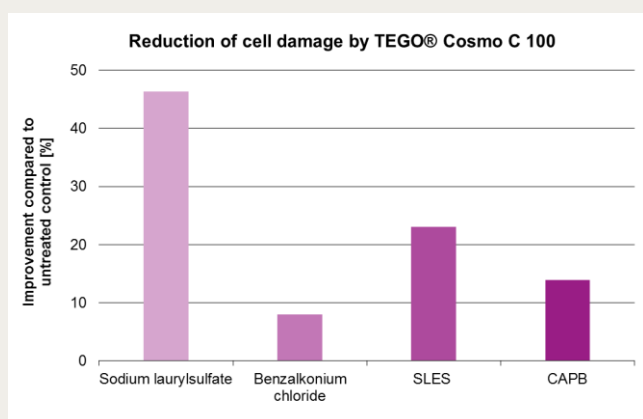


Fig. 3: Modified red blood cell (RBC) test

A defined number of erythrocytes (red blood cells) were treated for 1 hour with phosphate-buffered saline PBS as a standardized biological buffer (control) or PBS containing 1% of **TEGO® Cosmo C 100**.

Afterwards, blood cells were stressed for 10 minutes with surfactants at defined concentrations.

Damaged, or lysed, cells can be determined by a spectroscopic determination of free hemoglobin. Free hemoglobin is proportional to the number of lysed cells.

The efficacy of **TEGO® Cosmo C 100** to reduce hemolysis (as compared to the blank) is clearly demonstrated in Fig. 3. A higher percentage difference indicates greater protection. It can be shown that damaging effects caused by surfactants are mitigated in cells preconditioned with **TEGO® Cosmo C 100**.

Preparation

TEGO® Cosmo C 100 is water soluble and cold processable. The maximum solubility in water is 14 g/L. Therefore the maximum usage concentration is depending on the amount of water present in the formulation.

Preparation of emulsions: **TEGO® Cosmo C 100** is added to the water phase and the emulsion is prepared in the usual way. **TEGO® Cosmo C 100** does not show a negative influence on the emulsion stability.

Recommended usage concentration:

0.5 – 1.4%

Application

TEGO® Cosmo C 100 can be used in the following products:

- Skin energizing formulations
- Skin soothing formulations
- Anti-aging formulations
- After sun products

Guideline Formulations

If you are interested in guideline formulations please visit our homepage

<https://personal-care.evonik.com>.

Hazardous goods classification

Information concerning

- classification and labelling according to regulations for transport of chemicals
- protective measures for storage and handling
- measures in case of accidents and fire
- toxicological and ecotoxicological effects

is given in our safety data sheets.

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