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info@avenalab.com
+381 (0) 69 / 55 65 029
www.avenalab.com

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Product Name: Copper Tripeptide-1 – 5000 ppm

INCI Name: Water, Glycerin, Copper Tripeptide-1, (+)-Arabinogalactan, 3-o-Ethyl Ascorbic Acid, Phenoxyethanol, Ethylhexylglycerin

CAS: 7732-18-5, 56-81-5, 89030-95-5, 9036-66-2, 86404-04-8, 122-99-6, 70445-33-9

Sequence: Gly–His–Lys·Cu^{2}

Chemical Classification: Copper peptide complex (dissolved in a water/glycerin base)

Functional Category: Skin and hair conditioner; active ingredient for skin regeneration, collagen synthesis stimulation, and improved skin elasticity.

Description: Copper Tripeptide-1 (GHK-Cu) is a chemical complex composed of a copper ion (Cu^{2}) bound to the tripeptide sequence glycine–histidine–lysine (GHK). This complex plays a crucial role in skin repair and regeneration. It acts as a signaling peptide that stimulates the synthesis of collagen, elastin, and glycosaminoglycans, thereby enhancing skin firmness, elasticity, and even tone. GHK-Cu exhibits strong antioxidant and anti-inflammatory properties, helping neutralize free radicals and accelerate wound healing. Regular use can reduce the appearance of wrinkles, scars, and hyperpigmentation while improving skin texture. It is highly valued in anti-aging formulations for its ability to stimulate cell regeneration, increase hydration, and restore skin vitality. It also proves effective in repairing UV-damaged skin and mitigating oxidative stress caused by external factors. When combined with other actives such as hyaluronic acid, niacinamide, or next-generation peptides GHK-Cu enhances both regenerative and moisturizing effects. Clinical studies have shown that GHK-Cu exhibits regenerative activity even at concentrations as low as 0.000001% (10^{6}%). The product appears as a clear, blue, odorless liquid containing 5000 ppm (0.5%) of active peptide.

Mechanism of Action: The mechanism of action is based on GHK-Cu's ability to function as a signaling molecule that activates cellular repair and regeneration processes. When the tripeptide binds to a copper ion, cell receptors recognize it and initiate the synthesis of collagen, elastin, and other structural proteins that provide firmness and resilience to the skin. At the same time, GHK-Cu modulates the activity of metalloproteinases enzymes responsible for the degradation of damaged proteins in the extracellular

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matrix ensuring a balanced tissue repair process. The complex also influences gene expression associated with wound healing, immune response, and protection against oxidative stress. In this way, GHK-Cu restores optimal cellular function, enhances intercellular communication, and increases the skin's energy potential. Acting at this level, the peptide not only stimulates new cell formation but also improves the skin's natural ability to regenerate and maintain structural stability. This explains why GHK-Cu is considered one of the most potent signaling peptides in cosmetology its effectiveness depends not on high concentration, but on its ability to trigger a chain of regenerative reactions within the cell and restore balance between synthesis and degradation of structural skin components.

Benefits:

- Boosts collagen production, enhancing skin firmness and elasticity.
- Accelerates wound healing and reduces recovery time.
- Reduces inflammation, redness, and irritation.
- Improves skin texture and tone, leaving it smoother and more even.
- Diminishes the appearance of wrinkles and scars, promoting a youthful look.
- Helps treat alopecia by stimulating hair growth.
- Protects the skin from free radical damage.
- Enhances hydration and regeneration effects when combined with other active ingredients.

Directions for Use: The usage and recommended concentrations of GHK-Cu peptide in cosmetic formulations depend on the product type and desired effect. This complex is used at extremely low concentrations typically from 0.001% to 0.1%. Lower concentrations are common in daily skincare products, while higher concentrations are used in professional anti-aging serums and regenerative treatments. GHK-Cu should be added during the cold-process phase at temperatures below 40 °C to preserve stability and bioactivity. It blends well with hyaluronic acid, niacinamide, ceramides, next-generation peptides, and soothing extracts, enhancing both regenerative and moisturizing effects. The optimal pH range is neutral to slightly acidic (5.0–7.0), ensuring complex stability and preventing copper ion dissociation. Due to its high efficacy and water-base stability, GHK-Cu is used in serums, gels, lotions, and creams designed for skin renewal, wrinkle reduction, scar improvement, and post-sun or post-procedure recovery. In a properly formulated system, the peptide acts long-term, promoting natural tissue repair process-

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es without irritation or the need for high active concentrations. It should not be combined with strong acids, retinoids, pure vitamin C, or powerful antioxidants. For external use only.

Comparative Advantages: A 1000 ppm GHK-Cu solution is used in standard skincare formulations intended for daily maintenance, where the peptide serves in low concentrations for hydration, soothing, and mild regeneration. This version is stable, gentle, and suitable even for sensitive skin. The 5000 ppm variant contains five times more active component and is intended for formulations requiring strong regenerative and anti-aging effects. It is used in smaller doses during the final formulation stage typically in professional serums, concentrates, and intensive skin-repair treatments. Due to the higher peptide content, this version delivers faster and more pronounced biological effects, though precise dosing (commonly 0.01–0.05% in the finished product) is recommended to maintain optimal tolerance and formula stability.

Note: Avoid ingredients that may form complexes with Cu ions. For example, the dipeptide carnosine has a structure similar to GHK and can bind copper ions, causing a purple discoloration. Similarly, EDTA as a chelating agent can react with copper peptides and turn the solution green. Avoid combining Copper Peptide-1 with octyl hydroxamic acid, allantoin, or ergothioneine. Copper Tripeptide-1 should also not be used with most skin-lightening agents such as niacinamide, arbutin, or with carbomer.

Animal Testing: In compliance with current European regulation (Regulation (EC) No. 1223/2009 on cosmetic products), this substance has not been tested on animals. The safety assessment of the raw material is based on available toxicological data, scientific literature, and validated alternative methods (in vitro and in silico). The term in silico refers to testing and evaluation methods conducted via computer modeling and simulations, rather than on living organisms (in vivo) or cell cultures (in vitro). This note confirms compliance with the animal testing ban and serves for informational purposes for further cosmetic formulation use.

GMO: Not GMO

Vegan: Contains no animal-derived components

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Storage: The product can be safely transported at temperatures up to 25 °C without loss of stability during short-term exposure to heat. However, for long-term storage, refrigeration between 4 °C and 8 °C is recommended. Peptides are sensitive to degradation caused by prolonged exposure to heat, light, and humidity. Lower temperatures slow down decomposition and help preserve bioactivity. When properly refrigerated, the peptide retains its efficacy and stability throughout its declared shelf life.