

TECHNICAL DATA SHEET

Product Name: Copper Tripeptide-1 - 5000 ppm

INCI Name: Aqua, 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·Cu²

Full Sequence Name: Glycyl-L-histidyl-L-lysine copper(II) complex

Synonyms: GHK-Cu; Prezatide Copper; L-Lysine, N2-(N-glycyl-L-histidyl)-, copper complex; [Glycyl-kN-L-histidyl-kN,kN3-L-lysinato(2-)]copper; Copper, [N2-(N-glycyl-L-histidyl)-L-lysinato(2-)]-; Copper peptide GHK-Cu; Copper tripeptide 1; Copper tripeptide-1; Cu-Tripeptide-1; GHK Copper; GHK-Cu Tripeptide; Copper peptide; H-Gly-His-Lys-OH Copper; H-GHK-OH Copper

Chemical Classification: Copper peptide complex dissolved in an aqueous/glycerin base

Functional Category: Skin- and hair-conditioning agent; active ingredient intended for skin renewal, support of collagen synthesis and improvement of skin elasticity.

IUPAC Name: copper; (2S)-6-amino-2-[[[(2S)-2-(2-aminoacetyl)azanidyl-3-(1H-imidazol-4-yl)propanoyl]amino]hexanoate

Description: Copper Tripeptide-1 (GHK-Cu) is a complex consisting of a copper ion (Cu²) bound to the tripeptide sequence glycine-histidine-lysine (GHK). This complex participates in skin renewal and remodelling processes and acts as a signalling peptide associated with the synthesis of collagen, elastin and glycosaminoglycans, thereby potentially contributing to improved firmness, elasticity and overall skin appearance. GHK-Cu exhibits antioxidant and anti-inflammatory properties, contributes to protecting tissue from oxidative stress and supports the skin's natural renewal processes. In cosmetic formulations, it is particularly valued for its potential to reduce the appearance of fine lines and wrinkles, improve skin texture, elasticity and tone, and support the renewal of skin exposed to environmental factors, including UV radiation and oxidative stress. Copper Tripeptide-1 is most commonly used in anti-ageing,

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hydrating and restorative formulations, as well as in products intended to help preserve the skin's protective barrier function. It combines well with hyaluronic acid, niacinamide, allantoin, ceramides, panthenol, squalane, other hydrating components, compatible peptides and soothing botanical extracts. These combinations enable the development of formulations intended to support hydration, skin renewal, elasticity and barrier function. When formulating with Copper Tripeptide-1, an appropriate pH must be maintained and conditions or ingredients that may destabilise the copper complex should be avoided. The recommended pH of the final formulation is generally 5.0-6.5, with approximately 5.5-6.0 considered optimal. Particular attention should be paid to strong oxidising and reducing agents, strongly acidic or alkaline conditions, and powerful chelating agents that may bind copper ions and affect complex stability. When anionic thickeners, including certain types of carbomer, are used, compatibility, viscosity and final-formulation stability should be evaluated. Laboratory studies indicate that GHK-Cu may exhibit biological activity at very low, nanomolar concentrations. However, its performance in the final cosmetic product depends on the applied concentration, complex stability, carrier composition and availability of the active substance in the skin. The product is supplied as a clear blue liquid without a pronounced characteristic odour and contains 5,000 ppm, equivalent to 0.5%, Copper Tripeptide-1.

Mechanism of Action: The mechanism of action is based on the ability of the GHK-Cu complex to function as a signalling molecule associated with skin renewal and regenerative processes. When the tripeptide binds a copper ion, it can participate in cellular signalling pathways related to the synthesis of collagen, elastin and other structural components that support skin firmness, elasticity and resilience. GHK-Cu also modulates the activity of metalloproteinases, enzymes involved in the breakdown and remodelling of damaged extracellular-matrix proteins, thereby supporting a balanced tissue-repair process. The complex may influence the expression of genes involved in wound healing, immune response and protection against oxidative stress. Its cosmetic efficacy therefore does not depend solely on high concentrations, but on its signalling role in processes that help maintain the balance between synthesis and degradation of structural skin components.

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Benefits:

- Supports collagen production and contributes to skin firmness and elasticity.
- Supports natural skin-repair processes and recovery.
- Helps soothe inflammation, redness and irritation.
- Helps reduce the visible appearance of wrinkles and scars.
- Suitable for hair-care formulations intended to support healthier-looking hair and scalp.
- Helps protect the skin from oxidative damage caused by free radicals.
- Complements hydrating and restorative active ingredients in cosmetic formulations.

Directions for Use: The use level of GHK-Cu in cosmetic formulations depends on the product type, its composition and the desired effect. This complex is applied at very low concentrations. The amount of active GHK-Cu in final formulations most commonly ranges from 0.001 to 0.1%, with the specific concentration determined according to the intended use and the manufacturer's documentation. This product contains 0.5% GHK-Cu; therefore, its use at 0.2-20% provides 0.001-0.1% active GHK-Cu in the final formulation. Higher product concentrations should be used only when justified by the intended application and confirmed by stability and safety testing. Add GHK-Cu during the final manufacturing stage at temperatures below 40 °C to preserve complex stability. It combines well with hyaluronic acid, niacinamide, allantoin, ceramides, panthenol, compatible peptides and soothing botanical extracts. These combinations are suitable for formulations intended to hydrate, improve elasticity and support the skin's natural renewal processes. The recommended pH of the final formulation is 5.0-6.5, with approximately 5.5-6.0 generally considered optimal. Strongly acidic or alkaline conditions may destabilise the complex and affect the bond between the peptide and copper ion. GHK-Cu is used in serums, gels, lotions and creams intended to reduce visible signs of ageing, improve the appearance of fine lines and wrinkles, and care for skin exposed to environmental factors. It may also be used in products intended for skin care after sun exposure or aesthetic treatments, provided that the safety of the final formulation is confirmed by appropriate testing. Combining GHK-Cu with strong oxidising or reducing agents, powerful chelating agents, or ingredients requiring a strongly acidic or alkaline pH is not recommended. Particular caution is required with pure L-ascorbic acid. Retinoids, vitamin C derivatives, cosmetic acids and antioxidants are not automatically incompatible with GHK-Cu; compatibility depends on

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their chemical form, concentration, pH and the overall formulation. For external use only.

Comparative Advantages: The 1,000 ppm GHK-Cu solution contains 0.1% active Copper Tripeptide-1 and is suitable for conventional daily skin-care formulations, including serums, creams and gels intended for hydration, soothing care and support of the skin's natural renewal processes. Its lower concentration allows simple and precise dosing in formulations requiring a smaller amount of active GHK-Cu. Suitability for sensitive skin depends on the complete formulation and must be confirmed by final-product testing. The 5,000 ppm version contains 0.5% active Copper Tripeptide-1, five times the concentration of the 1,000 ppm solution. Its advantage is that the same active GHK-Cu level can be achieved using five times less commercial solution, making it suitable for more concentrated serums, creams and professional formulations. Add during the final manufacturing stage at temperatures below 40 °C. If the desired concentration of active GHK-Cu in the finished product is 0.01-0.05%, use the 5,000 ppm solution at 2-10%. Achieving the same active-substance level would require 10-50% of the 1,000 ppm solution. The final concentration must be determined according to the intended use, the manufacturer's recommendation, and the results of stability and safety testing.

Compatibility Note: Ingredients capable of binding copper ions and thereby affecting the stability of the GHK-Cu complex should be avoided or carefully evaluated. Carnosine, for example, can coordinate copper and may cause changes in formulation colour and stability. Its combination with Copper Tripeptide-1 is not necessarily excluded but requires prior compatibility testing. EDTA is a strong chelating agent that may remove copper from the peptide complex and affect its stability, activity and colour; its use in formulations containing Copper Tripeptide-1 is therefore generally not recommended. Caution is also required with hydroxamic acids, including Caprylhydroxamic Acid, and other ingredients with a pronounced affinity for copper ions. Allantoin is not considered incompatible with Copper Tripeptide-1 and may be used at an appropriate pH, subject to stability testing. Ergothioneine, however, may bind copper and participate in its reduction from Cu(II) to Cu(I), so this combination requires laboratory evaluation. Copper Tripeptide-1 may be combined with niacinamide and arbutin at an appropriate pH, preferably approximately 5.0-6.0, subject to final-formulation stability testing. Carbomers require caution because the copper complex may affect the viscosity, colour and stability of certain gels; prior compatibility testing is recommended.

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Animal Testing: In accordance with the applicable European legislation, namely Regulation (EC) No 1223/2009 on cosmetic products, the 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 testing methods, including in vitro and in silico methods. In silico refers to testing and assessment methods performed using computer models and simulations rather than on living organisms or cell cultures. This statement confirms compliance with the animal-testing ban and is provided solely for informational purposes regarding the further use of the raw material in cosmetic formulations.

GMO: Non-GMO.

Vegan: Contains no components of animal origin.

Storage: The product may be transported safely at temperatures up to 25 °C, as short-term exposure to higher temperatures does not compromise its stability. For long-term storage, refrigeration at 4-8 °C is recommended. Peptides are sensitive to degradation during prolonged exposure to heat, light and moisture. Lower temperatures slow degradation and help preserve bioactivity. When stored correctly under refrigeration, the peptide retains its efficacy and stability throughout the declared shelf life.

Raw Material Origin: USA/China