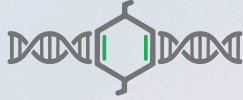


# BioMedical EMPORIUM



## BioMedical Emporium **COLLAGEN SERUM**

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# COSMECEUTICAL SIGNIFICANCE

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Skin ageing can be divided into two processes: intrinsic, or chronological ageing, and extrinsic ageing. Intrinsic ageing commences with the gradual degeneration of dermal tissue including areas generally protected from sunlight; thus, genetic factors affect the process. Although excessive exposure to the harmful effects of environmental factors can cause extrinsic ageing the explicit evidence of ageing skin can be ascribed to morphological changes at early stages in life. With the combination of these two ageing processes synergistic effects occur in the skin culminating in a more aged appearance, rough and dry texture, appearance of wrinkles, changes in pigmentation, loss of firmness and elasticity, and reduced barrier integrity.

Considering the dermal changes accompanied by natural ageing BioMedical Emporium presents a scientifically formulated Collagen Serum to target and impede dermal ageing.

Here is a brief review of some of the key bioactive ingredients in the BioMedical Emporium Collagen Serum. Hyaluronic acid, with its remarkable ability to harbor approximately 1000 times its weight of water, is found at interfaces of collagen and elastin fibers where it ensures proper configuration of

collagen and elastin. Within aged skin the absence of connections formed by hyaluronic acid can lead to the disorganization of collagen and elastin. The application of hyaluronic acid can improve the appearance of wrinkles, fine lines, and nasolabial folds. The ability of hyaluronic acid to replenish and moisturize the skin creates a softer, smoother, and increasingly radiant skin appearance. Increased dermal hydration slows down wrinkle formation and improves the appearance of deep fine lines and wrinkles generally appearing with age. Additionally, the antioxidant effects of hyaluronic acid promote cell regeneration and stimulate the production of collagen.

Collagen is the main protein component of skin tissue providing rigidity and ensuring the integrity of the dermal structures. Collagen peptides can be covalently linked through different peptide bond combinations and arrangements. Studies have reported that collagen peptides portray antioxidant, anti-ageing, immune regulation, and promoting tissue or wound repair effects. Collagen peptides can avoid degradation by selecting an appropriate molecular weight and carrier delivery, combined with other antioxidants to improve their bioavailability. Including antioxidants like tocopherol

acetate and niacinamide is imperative to guard the skin against ageing processes and limit collagen degradation.

Niacinamide, an active form of vitamin B<sub>3</sub>, is notoriously utilized as a photoprotective agent due to its stabilization of the epidermal barrier by reducing TEWL which increases the moisture content of the SC. Niacinamide also increases the synthesis of dermal proteins like keratin, stimulates ceramide production, and accelerates the differentiation of keratinocytes to maintain skin elasticity.

Tocopherol acetate limits TEWL to support the ECM and protect against signs of ageing. The photoprotective effects of tocopherol acetate prevent free radical formation caused by UVB exposure. Hence, skin damage such as erythema, edema, and sunburns can be reduced by applying vitamin E topically before UV exposure. Based on the scientific selection of ingredients included in the BioMedical Emporium Collagen Serum graceful ageing can be supported by building the natural skin matrix to improve skin elasticity.

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# THE CLINICAL POTENTIAL OF HYALURONIC ACID

## A powerful builder of the skin matrix

### **Cosmeceutical features:**

↓ depth of wrinkles, ↑ appearance of fine lines, ↑ appearance of nasolabial folds, ↑ dermal moisture, ↑ skin elasticity, ↑ skin smoothness, ↑ dermal radiance

**Physiology:** ↑ HAS-1, ↑ HAS -2, ↑ CD44, ↑ RHAMM, ↑ cell regeneration, ↑ collagen production, ↑ TGF-β1, ↑ fibroblast locomotion

## Promotes the cell's ability to uphold dermal proteins

### **Cosmeceutical features:**

↓ depth of wrinkles, ↑ appearance of fine lines, ↑ appearance of nasolabial folds, ↑ dermal moisture, ↑ overall skin health, ↑ skin elasticity, ↑ skin smoothness, ↑ dermal radiance

**Physiology:** ↑ HAS-1, ↑ HAS -2, ↑ CD44, ↑ RHAMM, ↑ configuration of collagen and elastin, ↑ cell regeneration, ↑ collagen production, ↑ TGF-β1, ↑ fibroblast locomotion

## Improving and protecting the skin against signs of ageing

### **Cosmeceutical features:**

↓ depth of wrinkles, ↑ appearance of fine lines, ↑ appearance of nasolabial folds, ↑ dermal moisture, ↑ skin elasticity, ↑ skin smoothness, ↑ dermal radiance

**Physiology:** ↑ HAS-1, ↑ HAS-2, ↑ CD44, ↑ RHAMM, ↑ cell regeneration, ↑ collagen production, ↑ TGF-β1, ↑ fibroblast locomotion

# THE CLINICAL POTENTIAL OF NIACINAMIDE

## A powerful builder of the skin matrix

### **Cosmeceutical features:**

↑ wrinkle appearance, ↓ fine line formation, ↑ skin elasticity, ↑ skin smoothness

**Physiology:** ↑ ceramides, ↑ intercellular lipids, ↑ SPT mRNA, ↑ keratinocytes

## Promotes the cell's ability to uphold dermal proteins

### **Cosmeceutical features:**

↑ wrinkle appearance, ↓ fine line formation, ↑ skin elasticity, ↑ skin smoothness

**Physiology:** ↓ excess dermal GAGs, ↑ collagen synthesis

## Improving and protecting the skin against signs of ageing

### **Cosmeceutical features:**

↑ skin moisture, ↓ dermal dryness, ↑ skin elasticity, ↑ skin smoothness

**Physiology:** ↑ ceramides, ↓ TEWL, ↑ free fatty acids, ↑ cholesterol, ↑ keratinocytes

# THE CLINICAL POTENTIAL OF TOCOPHEROL ACETATE

## A powerful builder of the skin matrix

### **Cosmeceutical features:**

↑ wrinkle appearance, ↓ fine line formation, ↑ skin elasticity, ↓ skin dryness, ↑ skin smoothness

**Physiology:** ↑ protects epidermal cell membranes, ↑ protects lipids from oxidative damage

## Promotes the cell's ability to uphold dermal proteins

### **Cosmeceutical features:**

↑ wrinkle appearance, ↓ fine line formation, ↑ skin elasticity, ↓ skin dryness, ↑ skin smoothness

**Physiology:** ↑ keratinocyte production, ↑ fibroblast viability

## Improving and protecting the skin against signs of ageing

### **Cosmeceutical features:**

↓ pigmentation, ↑ wrinkle appearance, ↓ fine line formation, ↑ skin elasticity, ↓ skin dryness, ↑ skin smoothness

**Physiology:** ↓ MMP-1, ↓ collagen degradation, ↓ UVB-mediated COX-2 induction, ↓ peroxynitrite production, ↓ lipid peroxidation, ↓ ROS

# THE CLINICAL POTENTIAL OF COLLAGEN

## A powerful builder of the skin matrix

### **Cosmeceutical features:**

↓ depth of wrinkles, ↑ appearance of fine lines, ↑ appearance of nasolabial folds, ↑ dermal moisture, ↑ skin elasticity, ↑ skin smoothness, ↑ dermal radiance

**Physiology:** ↓ MMP-3, ↓ MMP-13, ↓ MMP-2, ↓ MMP-9, ↑ elastin, ↑ proteoglycans, ↑ glycosaminoglycans, ↑ hyaluronic acid synthase mRNA, ↑ skin moisturizing factor filaggrin, ↓ HYAL-1, ↓ HYAL-2

## Promotes the cell's ability to uphold dermal proteins

### **Cosmeceutical features:**

↓ depth of wrinkles, ↑ appearance of fine lines, ↑ appearance of nasolabial folds, ↑ dermal moisture, ↑ skin elasticity, ↑ skin smoothness, ↑ dermal radiance

**Physiology:** ↓ MMP-3, ↓ MMP-13, ↓ MMP-2, ↓ MMP-9, ↑ elastin, ↑ proteoglycans, ↑ glycosaminoglycans, ↑ hyaluronic acid synthase mRNA, ↑ skin moisturizing factor filaggrin, ↓ HYAL-1, ↓ HYAL-2

## Improving and protecting the skin against signs of ageing

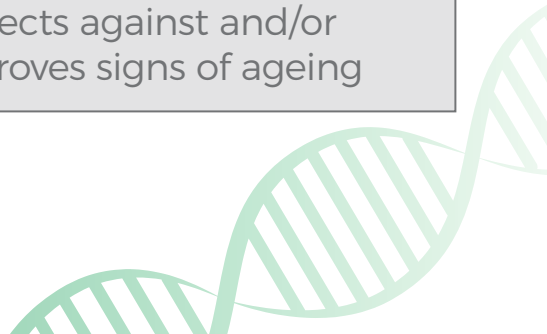
### **Cosmeceutical features:**

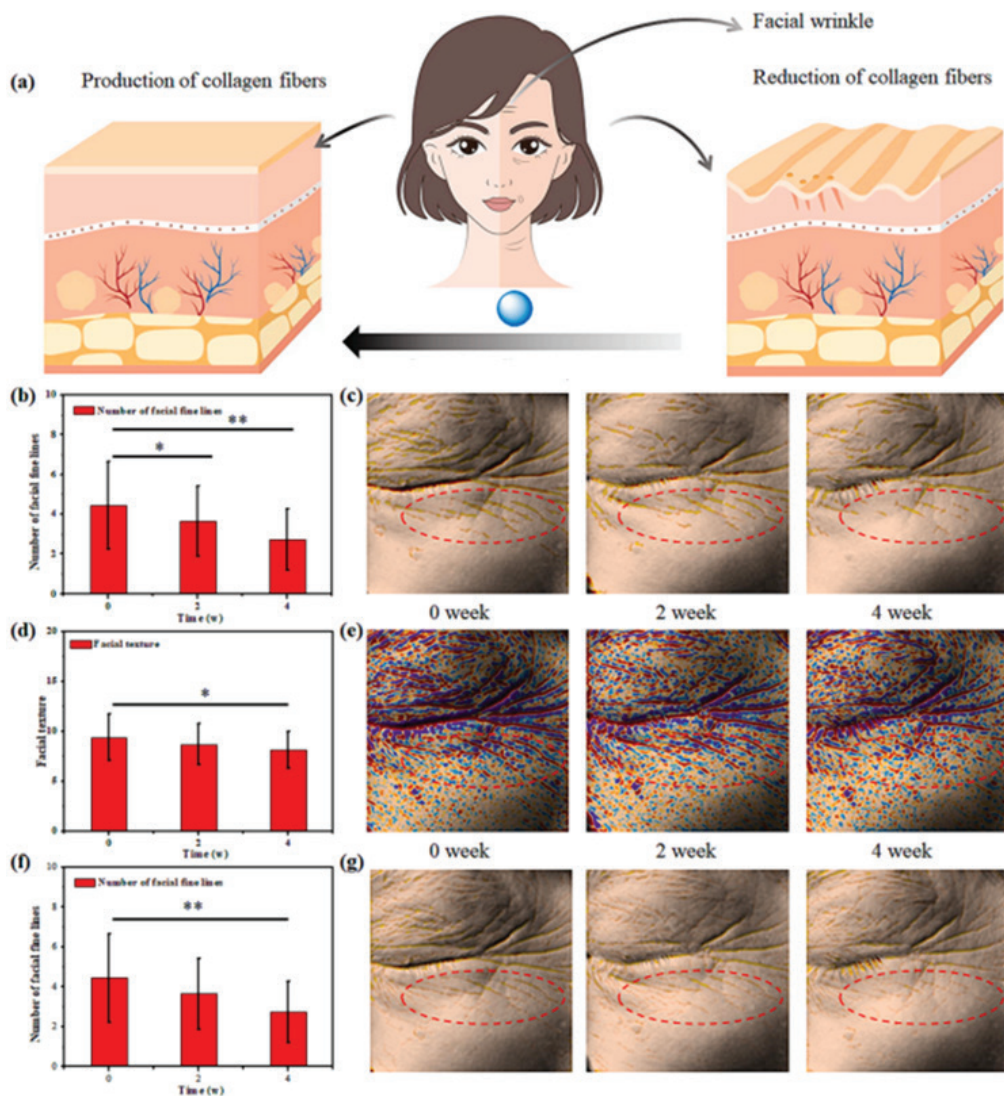
↓ skin moisture loss from UVB, ↑ preventing UVB-induced cell damage, ↓ UVB-mediated photoaging of skin, ↓ depth of wrinkles, ↑ appearance of fine lines, ↑ appearance of nasolabial folds, ↑ dermal moisture, ↑ skin elasticity, ↑ skin smoothness, ↑ dermal radiance

**Physiology:** ↑ GSH, ↑ SOD, ↓ ROS, ↑ hyaluronic acid synthase mRNA, ↑ skin moisturizing factor filaggrin, ↓ HYAL-1, ↓ HYAL-2

**Table 1: Classification and clinical significance of cosmeceutical ingredients included in the BioMedical Emporium Collagen Serum**

<b>INGREDIENT</b>	<b>CLASSIFICATION</b>	<b>REASON FOR INCLUSION</b>
<b>Hyaluronic acid</b>	Nonsulfated glycosaminoglycan	A powerful builder of the skin matrix, promotes the cell's ability to uphold dermal proteins, improves dermal moisturization, and protects against and/or improves signs of ageing
<b>Niacinamide</b>	Water-soluble vitamin, antioxidant	Lightening effect, photoprotective, improves barrier protective function of the skin, prevents collagen degradation, improves the appearance of wrinkles and fine lines
<b>Tocopherol acetate (vitamin E)</b>	Lipid-soluble vitamin, antioxidant	Reduces lipid peroxidation, photoprotective, prevents collagen degradation and improves skin moisturization
<b>Collagen</b>	Protein, antioxidant	A powerful builder of the skin matrix, promotes the cell's ability to uphold dermal proteins, and protects against and/or improves signs of ageing





**Figure 1.** Evaluating the efficacy of collagen-based therapy on facial wrinkles. **(a)** Schematic diagram of the face before and after wrinkle removal, **(b, c)** the number of facial wrinkles, **(d, e)** texture, and **(f, g)** facial fine lines before and after utilizing collagen-based therapy (n = 33; \*p < 0.05, \*\* p < 0.01) (Lu *et al.*, 2024).

## ABBREVIATIONS

<b>CD44:</b>	type of cell surface adhesion receptor
<b>COX-2:</b>	cyclooxygenase-2
<b>ECM:</b>	extracellular matrix
<b>GAGs:</b>	glycosaminoglycans
<b>GSH:</b>	glutathione
<b>HAS:</b>	hyaluronan synthase
<b>HYAL:</b>	hyaluronidase
<b>MMP:</b>	matrix metalloproteinase
<b>mRNA:</b>	messenger Ribonucleic Acid
<b>RHAMM:</b>	receptor for hyaluronan-mediated motility
<b>ROS:</b>	reactive oxygen species
<b>SC:</b>	stratum corneum
<b>SOD:</b>	superoxide dismutase
<b>SPT:</b>	single particle tracking
<b>TEWL:</b>	transepidermal water loss
<b>TGF-<math>\beta</math>1:</b>	transforming growth factor- $\beta$ 1
<b>UV:</b>	ultraviolet
<b>UVB:</b>	ultraviolet B radiation

## **WARNINGS**

Due to its natural abundance, biodegradability, and biocompatibility, hyaluronic acid is non-toxic and non-sensitizing, making it safe to use for all skin types with no risk of allergic reactions. Side effects from the topical application of niacinamide are minor and rare. Reported side effects include mild burning, pruritis, and erythema. However, these side effects tend to improve with continued use. Vitamin E and its derivatives are widely used in many cosmetic and dermatological products. In general, literature reporting side effects such as allergic or irritant skin reactions are rare.

A low incidence of irritation or allergic reactions to collagen, especially to collagen analogues, is reported. BioMedical Emporium Collagen Serum contains collagen and the risk of possible xenogeneic-origin allergy is minimal.

## **STORAGE INSTRUCTIONS**

This product is packed in an airless, opaque container, providing protection from oxygen exposure and ambient light. Store at or below 25°C.

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