

PhytoCodine® Actives

NEW

Natural Messenger Peptides to
Reprogram Skin Structure



BSB  **Innovation Award®**
Cosmetics 2020
3. Prize Category Most Innovative Raw Material

We make beauty natural.

Summary | PhytoCodine® - Natural Messenger Peptides to Reprogram Skin Structure

A person's perceived age is determined by physical traits on face and neck. These traits mostly reflect the integrity of the extracellular matrix, which provides structure, homogeneity and elasticity to skin.

Matrikines are dermal messenger peptides that instruct skin cells to reorganize and build-up the extracellular matrix. So far, synthetic matrikines have been used in cosmetics. Now, Lipoid Kosmetik investigated and isolated – for the first time – natural matrikine-like peptides from cedar nuts, and presents them in a novel anti-aging concentrate: PhytoCodine®.

We show that PhytoCodine® mimics the activity of matrikines that naturally occur in our skin. PhytoCodine®

activates the formation of extracellular matrix components, optimizes skin structure, and improves age-related properties of mature skin, such as elasticity, density, wrinkles and sagging.

Taken together, PhytoCodine® is the world's first concentrate of plant-derived, natural matrikine-like peptides. It reprograms fibroblasts to build-up extracellular matrix components characteristic of younger looking skin and thereby, PhytoCodine® directly contributes to a person's perceived age.

ACTIVE INGREDIENTS	PROVEN EFFICACY	USER BENEFITS
<ul style="list-style-type: none"> • Matrikine-like peptides from cedar nut • Liposomal carrier for peptide penetration enhancement • Eleutherosides from Siberian ginseng for peptide protection 	<p><i>in vitro</i></p> <ul style="list-style-type: none"> • Enhanced synthesis of extracellular matrix <p><i>in vivo</i></p> <ul style="list-style-type: none"> • Improved age-related properties of facial skin (e.g. elasticity, density, wrinkles) 	<ul style="list-style-type: none"> • Renewal of extracellular matrix • Improvement of dermal surface & texture • Support of facial density & elasticity • Rejuvenating effect of mature skin

Product Details

PhytoCodine® contains natural matrikine-like peptides obtained from enzymatic cleavage of *Pinus sibirica* seed proteins, encapsulated in a liposomal carrier system and embedded in a glycerin matrix of Siberian ginseng extract. COSMOS-approved, preservative-free/ self-preserving.



3. Prize Category Most Innovative Raw Material

Molecular Messengers in our Skin Facilitate Cellular Signaling & Communication

Our skin is an integrated network of cells that communicate with each other using biological messengers – small molecules that carry information (Fig. 1). Cellular signaling and cell-to-cell communication control e.g. inflammation, skin repair, melanogenesis or aging. Examples of signaling messenger molecules are cytokines, neurotransmitters, growth factors, or

matrikines, which freely diffuse between cells and transmit their messages by binding to cell surface receptors ^[1]. With age, the activity of signaling and communication declines. This strongly affects the extracellular matrix impacting skin texture and topography ^[2].

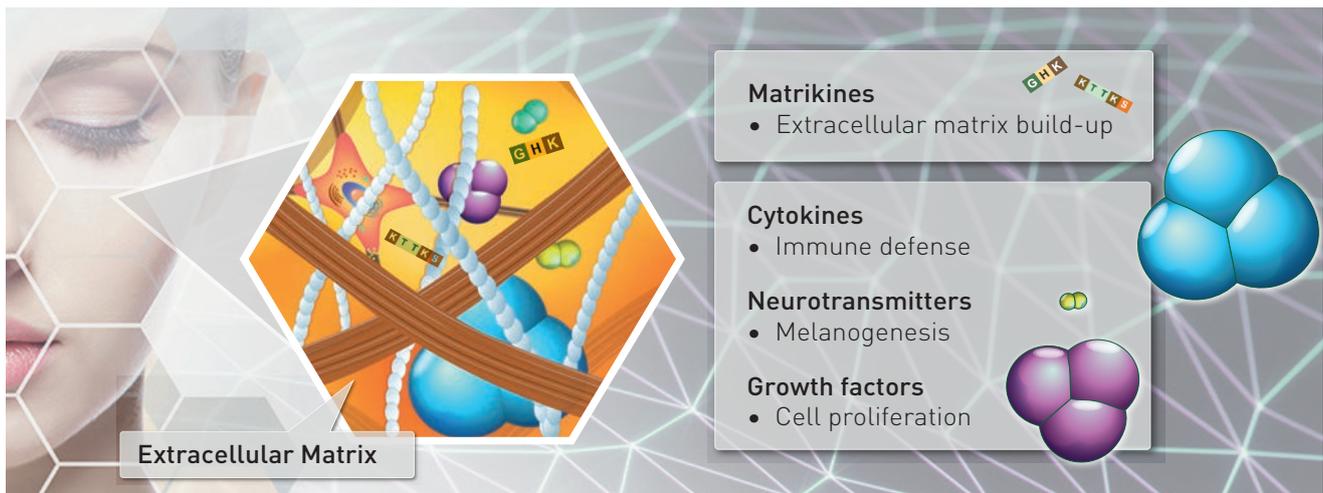


Fig. 1: Our skin is a network of cells that communicate with each other by sending and receiving information e.g. via small messenger molecules. Typical messengers in skin with a characteristic function are indicated above. Of note, matrikines are very small molecules and are therefore best suited for cosmetics.

Synthetic Matrikines and their Use in Cosmetics

Matrikines are one type of dermal messengers that naturally occur in our skin. Matrikines are short peptides with defined amino acid sequences. Functionally, matrikines interact with receptors on the surface of dermal fibroblasts and - depending on their sequence - activate intracellular signaling pathways that lead to cellular events, such as cell proliferation, protein synthesis, or matrix formation ^[3, 4].

Matrikines promote ECM synthesis

The extracellular matrix (ECM) consists of a network of interwoven macromolecules that give structure and elasticity to skin. Dermal fibroblasts are the factories of extracellular matrix proteins producing collagen, elastin or fibronectin. Matrikines regulate fibroblast activity by binding to specific receptors on their cell surface, initiating a series of intracellular processes that finally lead to enhanced ECM production. This

way, matrikines trigger ECM formation and directly contribute to skin elasticity, strength and resilience.

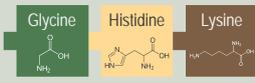
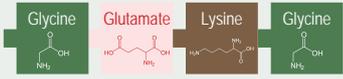
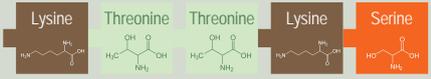
Cosmetic Applications of Synthetic Matrikines

Three specific matrikines (Tab. 1) have been shown to stimulate the formation of ECM components, such as collagen I, III, and VII, elastin or fibronectin – all of which deplete considerably when skin ages ^[2]. Not surprisingly, synthetic matrikine analogues have been used in anti-aging preparations to enforce the extracellular matrix ^[1, 5].

Novel Natural Matrikines

As cosmetics is getting more natural, Lipoid Kosmetik investigated and isolated for the first time natural (non-synthetic) matrikine-like peptides from cedar nuts and presents them in a new anti-aging concentrate: PhytoCodine®.

Synthetic Matrikines and their Use in Cosmetics

Matrikine	Amino Acid Sequence	Cosmetic Use
G H K	 <p>Glycine Histidine Lysine</p>	The tripeptide GHK is a matrikine that enhances collagen synthesis. In cosmetics, it improves dermal collagen levels ^[1,7,8] .
G E K G	 <p>Glycine Glutamate Lysine Glycine</p>	The tetrapeptide GEKG is a matrikine that enhances secretion of pro-collagen, hyaluronic acid and fibronectin in skin. In cosmetics, it improves fine lines and wrinkles ^[1] .
K T T K S	 <p>Lysine Threonine Threonine Lysine Serine</p>	The pentapeptide KTTKS is a matrikine that promotes fibronectin, collagen and hyaluronic acid production ^[9] . In cosmetics, it improves fine lines and wrinkles ^[1,10] . A synthetic palmitoylated pal-KTTKS is known as Matrixyl [®] .

Tab. 1: Important matrikines that naturally occur in our skin - their synthetic analogs have been applied in cosmetics. Structurally, matrikine peptides are short chains of amino acids with defined sequences. The sequence determines the activity of the corresponding peptide. Bioactive peptides are recognized by receptors on the surface of fibroblasts, which trigger intracellular processes, as for instance the production of extracellular matrix proteins, and are therefore very attractive for cosmetic applications.

Identification of the Optimal Source for Natural Matrikines

Lipoid Kosmetik developed a unique technology to make natural matrikine-like peptides available for cosmetics. We systematically searched and identified matrikine-like peptide sequences in cedar nuts.

In a first step, we pre-screened diverse plant resources for criteria based on proteomics, amino-acid profiles, appropriate protein amount, as well as scientific literature, and selected cedar nut as the best natural source for matrikine-like peptides (Fig. 2, 3). In

a second step, we tested a variety of specific proteases (enzymes that cleave proteins at defined positions) and generated several unique sets of peptides. Finally, we sequenced each set and fed thousands of sequences into a database. Using a homology search (BLAST - Basic Local Alignment Search), we identified one set containing several cedar nut peptides with strong homology to naturally occurring matrikines of our skin (Fig. 3).



Fig. 2: Wild-picked seeds of cedar trees grown in the Siberian Taiga - the ecologically purest area of the world, a virgin forest almost untouched by human. Seeds of cedar trees take two years to mature accumulating 10 % protein with unique amino-acid profile.

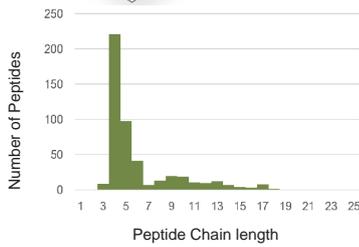
PhytoCodine[®] provides natural matrikine-like peptides from cedar nuts as alternative for synthetic matrikines.

Novel Technology to Produce Natural Matrikines



Step 1: Isolation of Cedar Nut Protein

Careful isolation of proteins from cedar nuts using protein purification and supercritical carbon dioxide (CO₂) extraction methods.



Step 2: Enzymatic Cleavage

Cleavage of cedar nut proteins using specific proteases produces highly reproducible sets of peptides with an optimal average peptide chain length of 4-5 amino acids.



Step 3: Sequencing of Peptides

Sequencing various sets of peptides (one for each protease screened) and feeding thousands of sequences into a database.

Step 4: Homology (BLAST) Search for Matrikines

Identification of homologous matrikine-like peptides

Peptide Database



Homology Search

Target	Matches												
Matrikine peptides from skin	Homologous matrikine peptides from cedar nuts												
G H K	<table border="0"> <tr><td>Y G H K</td><td>100 %</td></tr> <tr><td>S V G H K</td><td>100 %</td></tr> <tr><td>V S G H K</td><td>100 %</td></tr> <tr><td>L T G H K</td><td>100 %</td></tr> <tr><td>L S G H K</td><td>100 %</td></tr> <tr><td>F P G H K</td><td>100 %</td></tr> </table>	Y G H K	100 %	S V G H K	100 %	V S G H K	100 %	L T G H K	100 %	L S G H K	100 %	F P G H K	100 %
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G E K G	W S N G P H Y G E K G Y M R 100 %												
K T T K S	<table border="0"> <tr><td>G T T K S R</td><td>80 %</td></tr> <tr><td>K T G K S P R</td><td>80 %</td></tr> </table>	G T T K S R	80 %	K T G K S P R	80 %								
G T T K S R	80 %												
K T G K S P R	80 %												

Fig. 3: Lipoid Kosmetik's technology produces natural matrikine-like peptides and makes them available for cosmetic applications. Proteases generate unique sets of short peptides from cedar nut proteins with an ideal average amino-acid chain length of about 4 amino acids, which were analyzed by mass spectrometry, de novo peptide sequencing. Using homology searches - matching original matrikine peptide sequences of our skin with cedar nut peptide sequences - we revealed several matrikine homologs (peptides with very similar sequences). Peptide sequences in the illustration are read from left to right using the amino acid 1-letter code ^[10].

Composition | PhytoCodine® - Anti-Aging Concentrate with 3 Components

Matrikine-Like Peptides

enhance ECM build-up



Active component

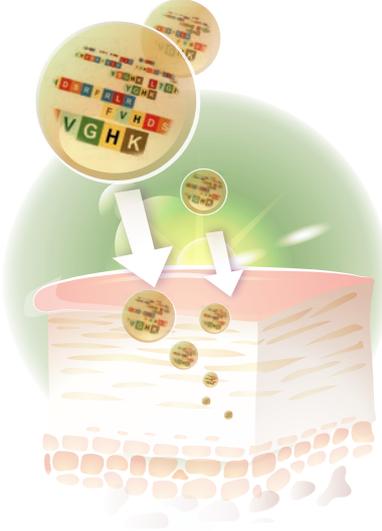
PhytoCodine® contains natural matrikine-like peptides from cedar nuts that enhance extracellular matrix (ECM formation).

Matrikines naturally occur in our skin and activate intracellular signaling pathways that lead to a build-up of the extracellular matrix. Until now, there are only synthetic matrikines available for cosmetic use.

With PhytoCodine®, Lipoid Kosmetik presents – for the first time – natural matrikines for cosmetic use.

Dermal Delivery System

for bioactive peptides



Functional component

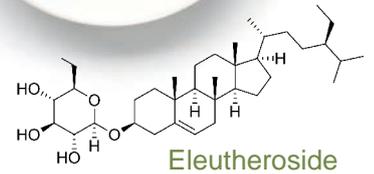
PhytoCodine® enhances the penetration of matrikine-like peptides.

Peptides are small molecules that must penetrate skin layers to reach dermal fibroblasts (their point of action).

PhytoCodine® comes with a liposomal carrier system for hydrophilic active ingredients that enhances penetration. In fact, *in vivo* studies using Raman spectroscopy demonstrate that penetration of model actives increased by 50 % after topical application.

Natural Eleutherosides

are protease inhibitors from Siberian Ginseng roots ^[14]



Functional component

PhytoCodine® protects the bioactivity of matrikine-like peptides.

Matrikine-like messenger peptides are sensitive to proteolytic degradation. Protease activity in the extracellular space quickly cleaves peptides, extinguishing their biological activity. Likewise, collagen and elastin are sensitive to proteolytic degradation.

PhytoCodine® contains natural eleutherosides – highly potent protease inhibitors from Siberian ginseng (*Eleutherococcus senticosus*).

High Performance TLC



— Eleutheroside A
 — Eleutheroside B
 — Eleutheroside E
 (References)

PhytoCodine®

Mode of Action | PhytoCodine® is a Signal for Skin Rejuvenation

Matrikine-like peptides from cedar nuts mimic the action of matrikines that naturally occur in our skin. They activate intracellular signaling pathways that lead to a build-up of the extracellular matrix and thereby trigger the renewal of the skin (Fig. 4).

After topical application of PhytoCodine®, matrikine-like messenger peptides penetrate the skin supported by a liposomal delivery system. Eleutherosides from Siberian ginseng roots protect the bioactivity of the peptides and stop matrix metalloproteinases from degrading the extracellular matrix.

Matrikine-like peptides bind to receptors at the cellular surface of fibroblasts. This activates genes responsible for extracellular matrix formation, finally leading to increased production and excretion of extracellular matrix proteins like collagen and elastin.

As a result, the mechanical properties of mature skin, such as elasticity, density, firmness and roughness, improve. In addition, skin texture gets finer and more homogeneous. This makes PhytoCodine® a powerful anti-aging active for mature skin.

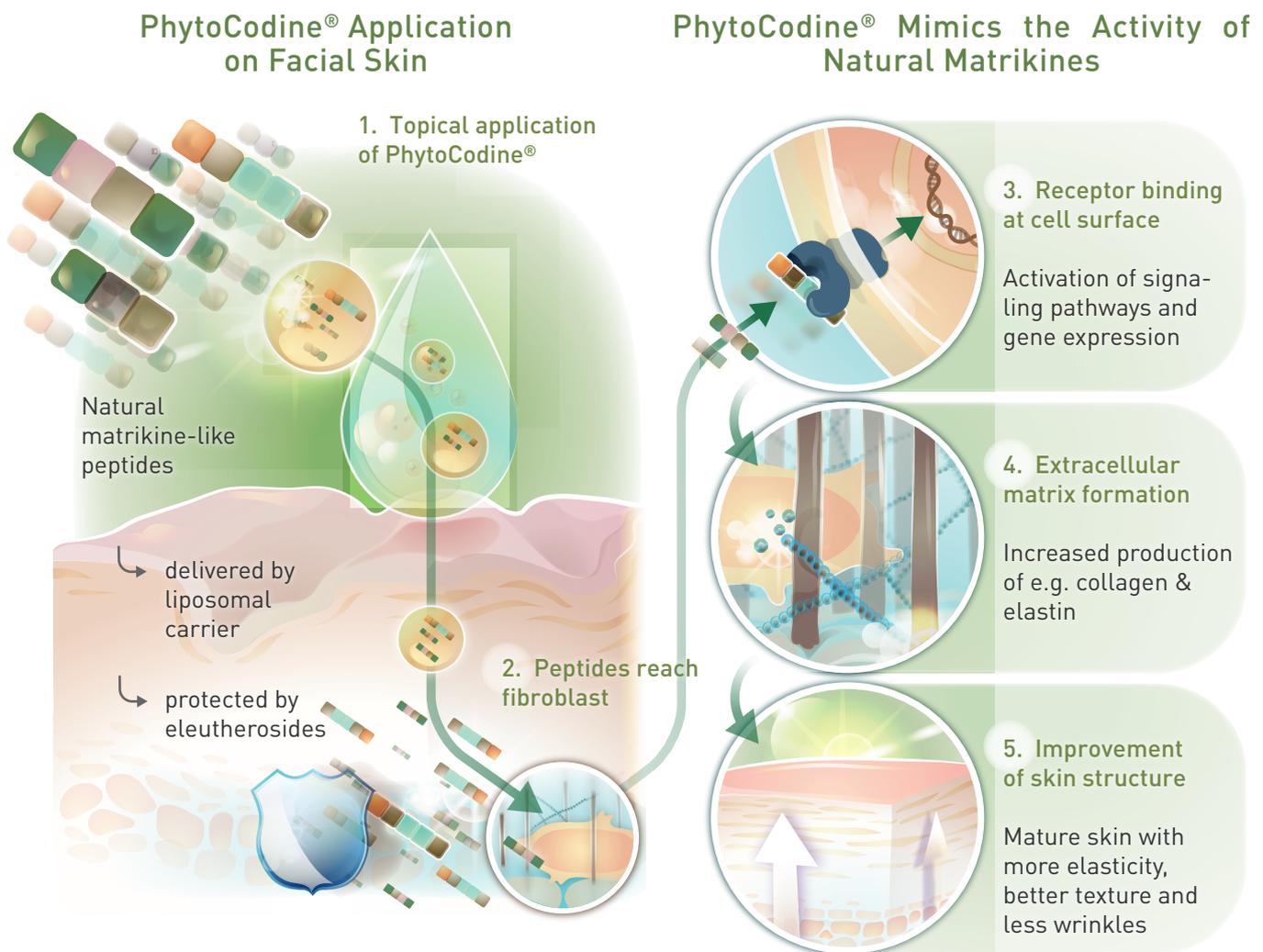


Fig. 4: PhytoCodine® is composed of natural messenger peptides mimicking the action of matrikines that naturally occur in our skin. Thereby, PhytoCodine® activates the formation of extracellular matrix proteins and improves age-related properties of mature skin.

in vitro Activity | PhytoCodine® Activates ECM Protein Synthesis

Objective

To study the effect of PhytoCodine® on gene activation and protein synthesis of two major extracellular matrix (ECM) proteins, collagen and fibronectin.

Technique

Collagen and fibronectin gene expression was tested by quantifying RNA transcripts using qPCR. Protein production was tested by quantifying protein release using ELISA.

Study Details

Design	Cell culture assay
Test Panel	Primary human dermal fibroblasts
Test Substances	<ul style="list-style-type: none"> Gene activation: untreated control, 0.1 % and 0.5 % PhytoCodine® Protein production: untreated control, 0.1 % and 0.5 % PhytoCodine®, 0.1 % and 0.5 % market reference (a commercially available, synthetic matrikine)
Application Frequency	Incubation for 48 h
Endpoint	<ul style="list-style-type: none"> Quantification of collagen mRNA and fibronectin mRNA Quantification of released pro-collagen protein and fibronectin protein

Result

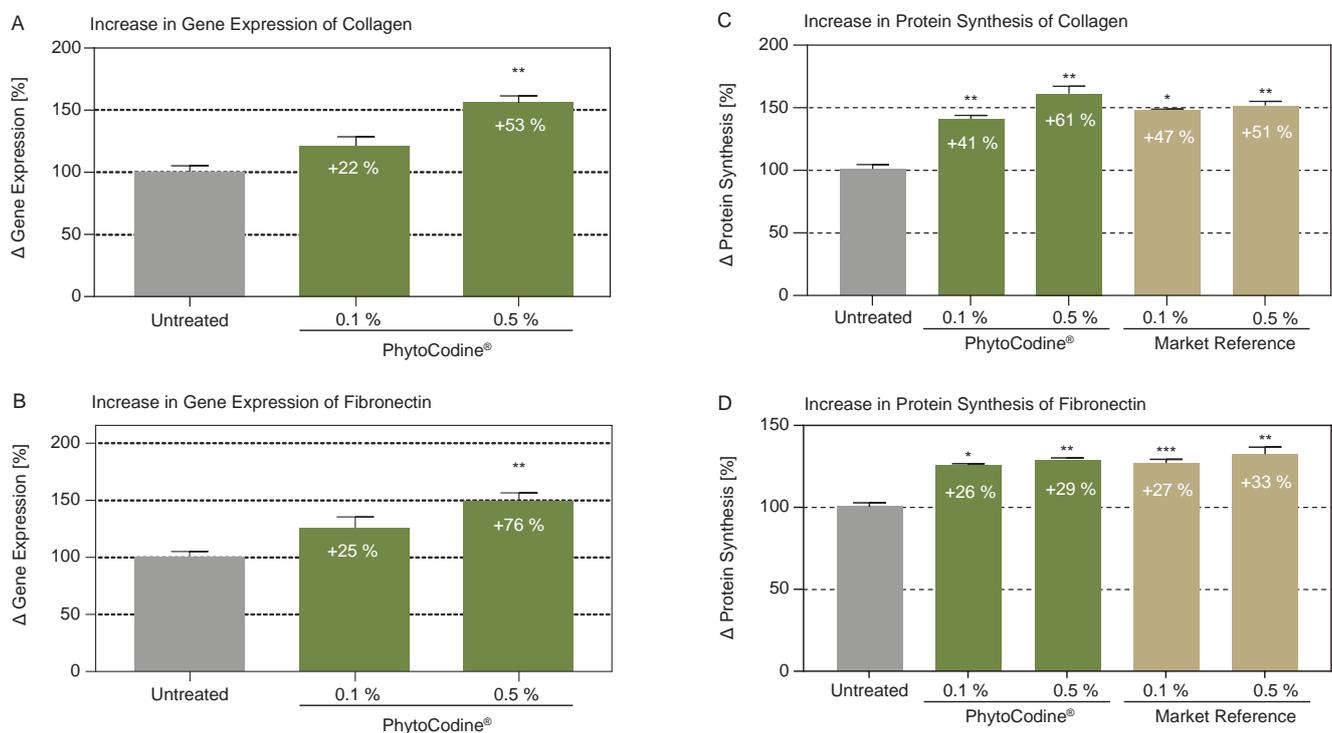


Fig. 5: PhytoCodine® activates ECM genes and protein synthesis in a dose dependent manner. (A, B) 0.5 % PhytoCodine® activated collagen gene expression by > 50 % and fibronectin gene expression by > 75 % versus untreated. (C, D) Similarly, 0.5 % PhytoCodine® increased the production of the extracellular matrix proteins pro-collagen and fibronectin by 61 % and 29 %, respectively. As expected, PhytoCodine® performed as good as the market reference [a commercially available, synthetic matrikine]. N = 3; Mean + SEM; Student's t-test vs. baseline; * = $p < 0.05$; ** = $p < 0.01$; * = $p < 0.001$.**

in vitro Activity | PhytoCodine® Activates ECM Protein Synthesis

Conclusion

PhytoCodine® mimics the function of matrikines that naturally occur in our skin. It activates extracellular matrix gene expression and protein synthesis (Fig. 5). This result confirms that matrikine-like peptides in PhytoCodine®

are active and functional. In chronological aging, the capacity of fibroblasts to secrete extracellular matrix protein declines. Therefore, this study confirms the anti-aging activity of PhytoCodine®.

PhytoCodine® mimics the activity of matrikines that naturally occur in our skin.

PhytoCodine® enhances the production of extracellular matrix proteins.

in vitro Activity | PhytoCodine® Optimizes Skin Structure

Objective

To study the effect of PhytoCodine® on skin texture by analyzing the morphology and structural integrity of skin as well as the organization and distribution of the extracellular matrix proteins elastin and collagen.

Technique

Ex vivo full thickness human skin tissues were treated with either PhytoCodine® or a market reference. Skin tissue morphology was analyzed from paraffin-embedded tissue sections.

Study Details

Design	<i>Ex vivo</i> immuno-histochemistry study
Test Panel	<i>Ex vivo</i> full thickness human skin tissues
Test Substances	<ul style="list-style-type: none">• Untreated control• 1 % market reference (a commercially available, synthetic matrikine)• 1 % PhytoCodine®
Application Frequency	One application and incubation for 48 h
Endpoint	Microscopic analysis of general skin morphology and organization of elastin and collagen fibers

in vitro Activity | PhytoCodine® Optimizes Skin Structure

Result

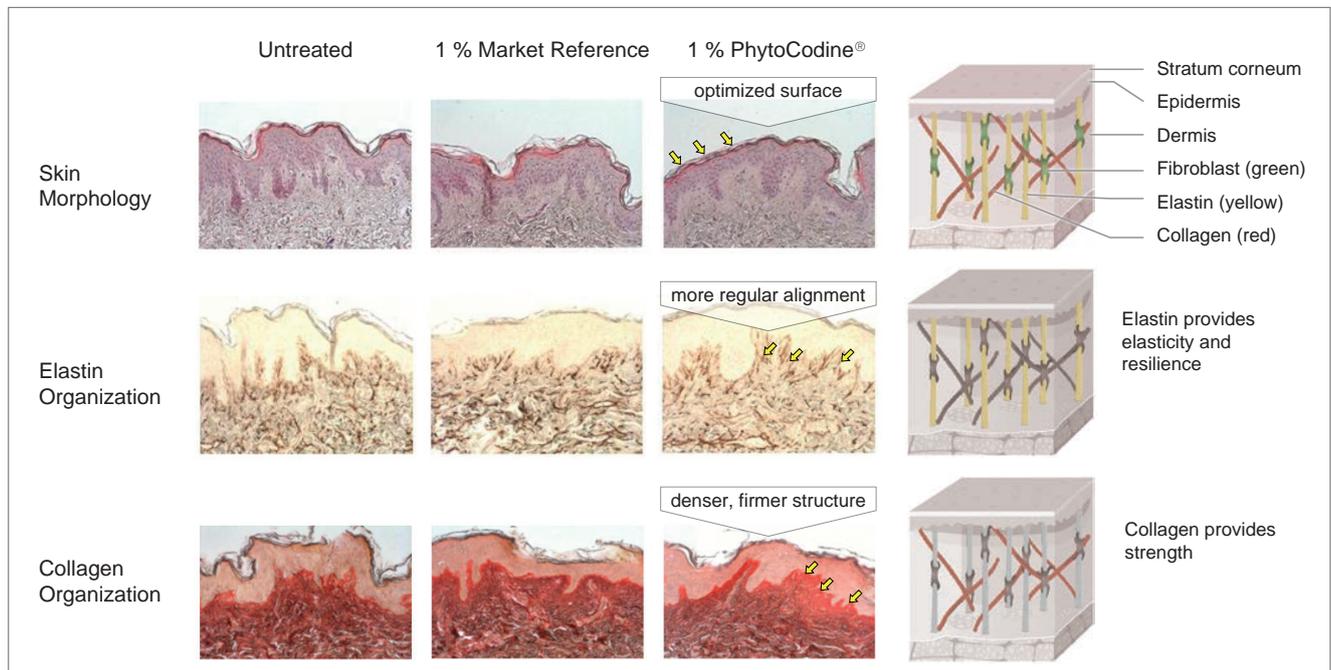


Fig. 6: PhytoCodine® improves skin morphology and skin texture. *Ex vivo* full thickness human skin tissues were treated with either PhytoCodine® or a market reference (a commercially available, synthetic matrikine) for 48 h. Skin tissue morphology was analyzed from hematoxylin/ eosin stained paraffin-embedded tissue sections using a Leica DM 2000 photomicroscope. Elastin organization was visualized by immunohistochemistry using specific antibody labelling. Collagen organization was visualized by staining with picrosirius red, an acidic hydrophilic colorant for collagen I and III fibers.

Conclusion

The skin surface appears smoother after treatment with PhytoCodine®, and the distribution of elastin, the skin's major component of elastic fibers, is more regular. Further, collagen I and III fibers appear denser and finer textured than in the untreated control (Fig. 6).

In aging skin, a loss of elastin and collagen organization compromises skin elasticity and resilience, which contributes to the appearance of wrinkles. By improving the organization and distribution of elastic fibers of the extracellular matrix (ECM), PhytoCodine® directly contributes to a more youthful appearance of the skin.

PhytoCodine® improves the organization and distribution of elastic fibers of the ECM.

PhytoCodine® optimizes skin texture and contributes to a more youthful appearance of the skin.

in vivo Activity | PhytoCodine® Improves Age-Related Properties of Facial Skin

Objective

To study the rejuvenating effects of PhytoCodine® on mature facial skin with three approaches:

- Placebo-controlled, instrumental assessment focusing on age-related parameters.
- Clinical assessment of selected facial areas that most contribute to an aged skin appearance.
- Self-assessment to analyze consumer satisfaction.

Technique

Placebo-controlled, double-blinded study with 21 mature women showing signs of aging (target group of anti-age products), including wrinkles, lack of firmness, or sagging. Volunteers applied a cream with 2 % PhytoCodine® to one hemiface and a placebo cream to the other. Measurements and self-assessment were monitored at day 0 and 56.

Study Details

Design	Double-blind, placebo-controlled, randomized <i>in vivo</i> study
Test Panel	21 Caucasian female volunteers, 40 - 65 years old with mixed to dry skin
Test Substances	Treatment with a cream containing 2 % PhytoCodine® or a placebo cream
Application Site	A cream formulation with 2% PhytoCodine® was applied to one hemiface, the same formulation without Phytocodine® (placebo) to the other
Application Frequency	Twice a daily for 56 days
Primary Endpoint	<ul style="list-style-type: none"> • Instrumental assessment of biomechanical properties (density, elasticity) and skin topography (roughness, wrinkles, sagging) • Clinical assessment of aging parameters focusing on selected facial zones • Self-assessment: Consumer opinion on efficacy and pleasantness of application

Result | Placebo-Controlled Instrumental Analysis of Biomechanical Skin Properties

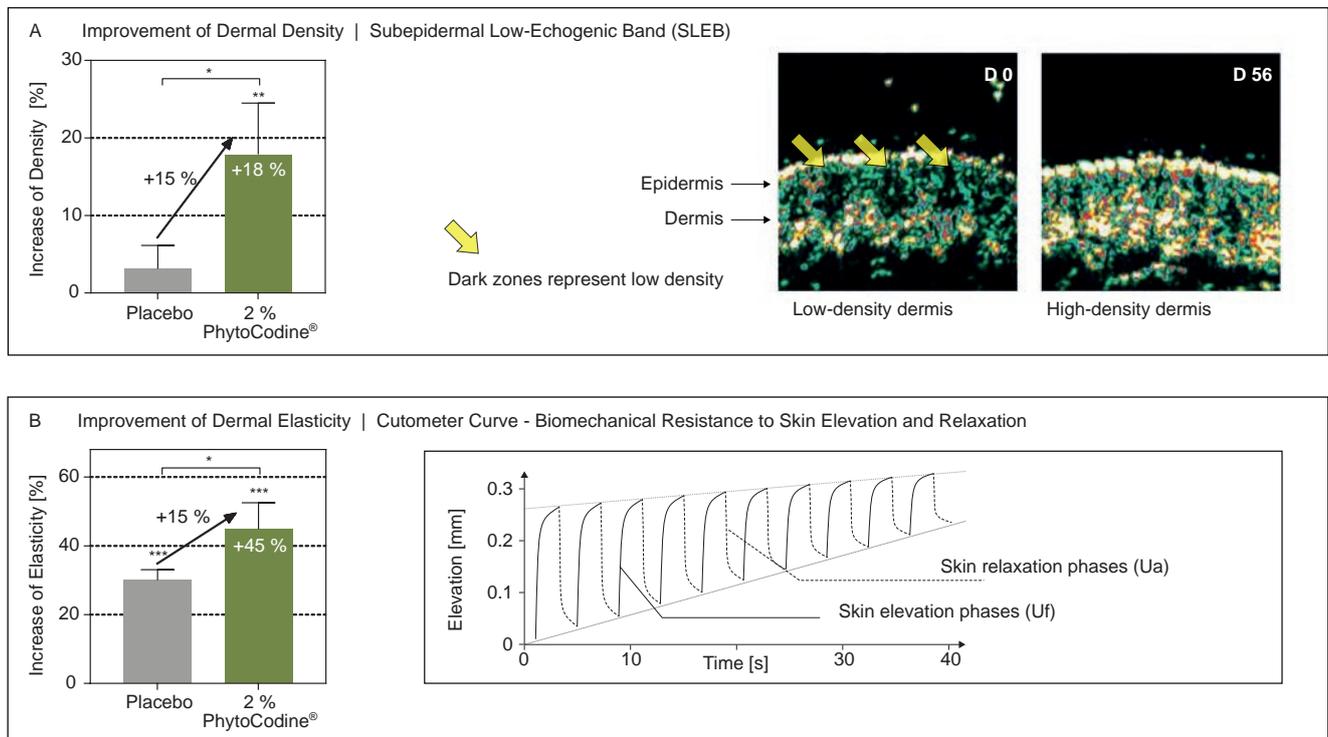


Fig. 7: PhytoCodine® improves age-related biomechanical parameters of facial skin. 21 women applied a cream with 2 % PhytoCodine® to one hemiface and a placebo cream to the other for 56 days. **(A)** PhytoCodine® increases sub-epidermal density. Images show changes in subepidermal density (light areas = high skin density, dark areas low density), measured with a skin ultrasonography ultrasound system DermalScan C. **(B)** PhytoCodine® increases elasticity and firmness. Elasticity (ratio between the ability of returning to the original position (Ua) and the maximal amplitude of elevation (Uf)) was measured with a Cutometer® dual MPA 580. N = 21; Mean + SEM. Student's t-test vs. baseline and between treatments; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$.

in vivo Activity | PhytoCodine® Improves Age-Related Properties of Facial Skin

Result | Placebo-Controlled Instrumental Analysis of Skin Topography

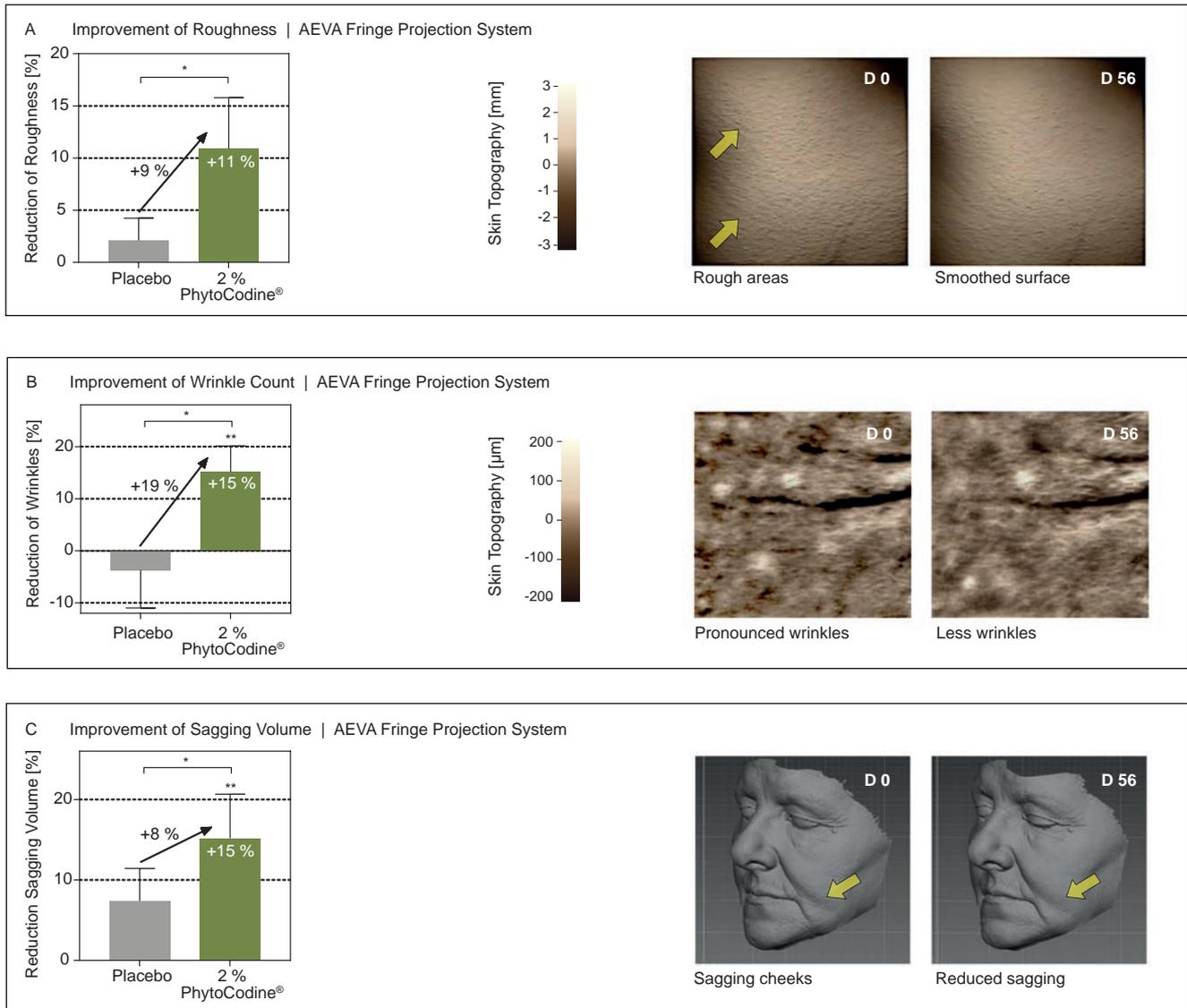


Fig. 8: PhytoCodine® improves the topography of facial skin. In a placebo-controlled consumer test, 21 women with mixed to dry skin applied a cream containing 2 % PhytoCodine® to one hemiface and a placebo cream to the other hemiface for 56 days. **(A)** PhytoCodine® reduces skin roughness. Representative images were obtained by Stereo-Fringe projection system AEVA®. **(B)** PhytoCodine® reduces the quantity of wrinkles. Representative images obtained by Stereo-Fringe projection system AEVA®. **(C)** PhytoCodine® has a lifting effect on facial skin. Representative images obtained by Stereo-Fringe projection system AEVA®. N = 21; Mean + SEM. Student's t-test vs. baseline and between treatments; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$.

in vivo Activity | PhytoCodine® Improves Age-Related Properties of Facial Skin

Result | Clinical Evaluation Before and After Treatment

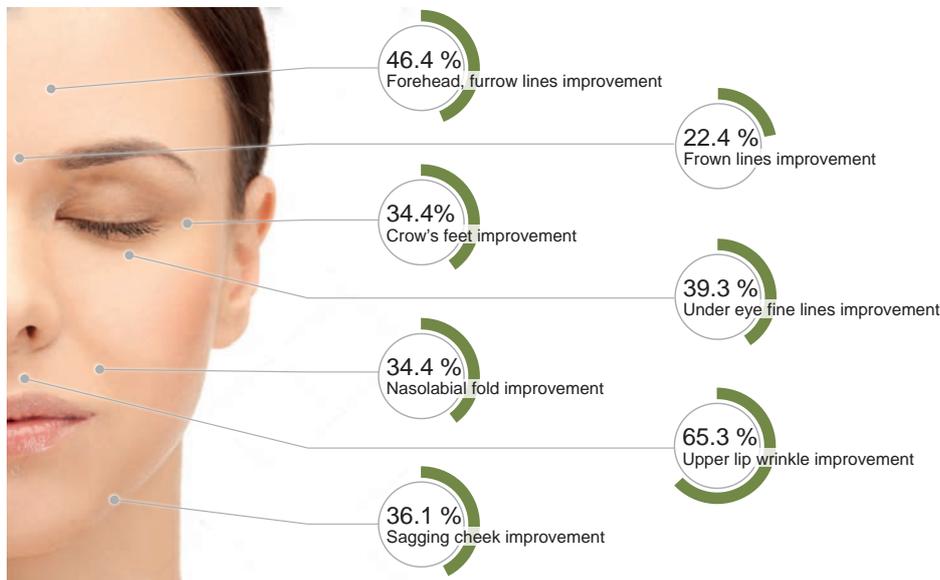


Fig. 9: PhytoCodine® improves the appearance of selected facial areas that most contribute to an impression of aged skin. Dermatologist evaluation using the corresponding grading system for each area: crow's feet according to the reference standard for the Japanese Cosmetics Industry Association ^[11]; undereye fine lines, nasolabial folds, frown lines, upper lip wrinkles according to ^[12]; forehead, furrow lines, lower cheek sagging according to ^[13]. Values show improvements in percent between day 0 and 56. N = 21; Mean.

Result | Consumer Self-Assessment After Treatment

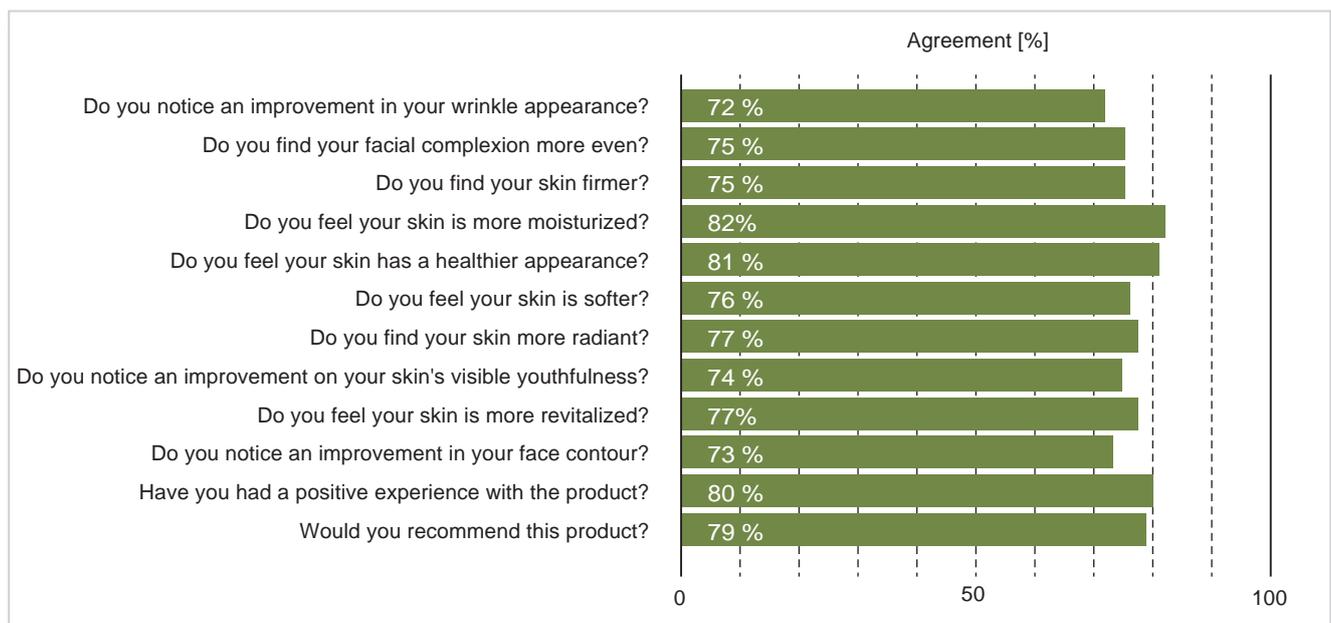


Fig. 10: Consumers experience a rejuvenating effect with PhytoCodine®. 21 Volunteers filled in a questionnaire after 56 days of treatment rating their agreement on 12 application-related questions on a scale from 1 to 10 (1 = no agreement, 10 = full agreement). The graph shows the number of volunteers scoring ≥ 6 in percent.

in vivo Activity | PhytoCodine® Improves Age-Related Properties of Facial Skin

Conclusion

PhytoCodine® activates extracellular matrix build-up and improves age-related parameters of facial skin *in vivo*, measurably, visibly, and significant (Fig. 7-9). Further, consumers experience direct rejuvenating effects of their facial skin (Fig. 10).

Taken together, PhytoCodine® is the world's first concentrate of plant-derived, natural matrikine-like

peptides. It reprograms fibroblasts to build-up extracellular matrix components characteristic of younger looking skin and thereby, PhytoCodine® directly contributes to a person's perceived age.

Natural matrikine-like peptides of PhytoCodine® act as signal for skin rejuvenation.

PhytoCodine® is a powerful anti-aging active for mature skin.

Frame Formulation

Matrix-Shaping Face Cream with PhytoCodine®, Acacia Collagen and LIPOID P 75-3

Phase	Ingredient	INCI	Function	Supplier	% w/w
A	Acacia Collagen Powder LIPOID P 75-3 Deionized Water KELTROL® CG-T Glycerin 99.5%	Acacia Seyal Gum Hydrogenated Lecithin Aqua (Water) Xanthan Gum Glycerin	Functional ingredient	Lipoid Kosmetik	0.10
			Emulsifier	Lipoid Kosmetik	3.00
B	Lanette® O Beeswax, pesticide removed dermofeel® sensolv Myritol® 318 Squalane, Olive SEPINOV™ EMT 10	Cetearyl Alcohol Beeswax Isoamyl Laurate Caprylic/ Capric Triglyceride Squalane Hydroxyethyl Acrylate/ Sodium Acryloyldimethyl Taurate Copolymer	Thickener	CP Kelco	0.15
			Humectant		4.50
			Consistency agent	BASF	1.50
			Consistency agent	Hammonia Oleochemicals	1.00
			Emollient	Evonik Nutrition & Care	3.00
C	PhytoCodine®	Glycerin, Aqua (Water), Lecithin, Hydrolyzed Pinus Sibirica Seedcake Extract, Acanthopanax Senticosus (Eleuthero) Root Extract, Pentylene Glycol, Sodium Hydroxide, Tocopherol	Emollient	BASF	2.50
			Emollient		4.00
			Thickener	SEPPIC	0.90
D	E-Leen® Green C NaOH Taiga	Pentylene Glycol, Glyceryl Caprylate/ Caprate Sodium Hydroxide Perfume (Fragrance), Citronellol, Limonene, Linalool	Active ingredient	Lipoid Kosmetik	1.00
			Preservative	MinaSolve	4.00
			Neutralizing agent		q.s.
			Fragrance	Frey & Lau	0.30

Procedure

- Disperse LIPOID P 75-3 in deionized water at 60 °C, add the remaining components of phase A
- Heat phase B to 70 °C
- Add phase B to A, homogenize
- Cool the emulsion down to 40 °C, add phase C and homogenize shortly again
- Cool further down to room temperature, add preservative and perfume
- Adjust the final pH to 6 - 7

Product Details of PhytoCodine®

Product Characteristics

- PhytoCodine® is a natural activator of extracellular matrix proteins with skin rejuvenating properties. It contains plant-derived, matrikine-like, bioactive peptides from enzymatic cleavage of *Pinus sibirica* seed proteins, encapsulated in a liposomal carrier system, all embedded in a glycerin matrix of Siberian ginseng extract.
- COSMOS-approved raw material
- Preservative-free/ self-preserving
- Pale, yellowish, turbid liquid

Recommended Applications

- Firming & resurfacing face cream
- Lifting & anti-sagging
- Recontouring eye cream
- Recompressing cream for face and neck
- Age-control day cream
- Age-defense night mask
- Skin matrix repair cream

Recommended Usage

- Recommended use level: 0.5 – 3 %
- Final cosmetic products with PhytoCodine® can be claimed as e.g. 'Contains Swiss-manufactured ingredient'.

Formulation Recommendation

- PhytoCodine® is suitable for o/w, w/o emulsions and water-based products. It is exceptionally stable at high temperatures which enables usage in hot processes.
- PhytoCodine® has a mild, nutlike scent, which is imperceptible in finished products. PhytoCodine® is a yellowish, turbid, viscous liquid. When used in emulsions it is invisible. When used in clear water-based products slight turbidity might appear.
- For detailed information, please ask for our report 'Stability and formulation recommendations' (info@lipoid-kosmetik.com).

Safety

- Non-phototoxic (OECD 432)
- Non-irritating for skin (HRIPT, repeated human patch test), when tested undiluted on 50 volunteers
- Non-sensitizing for skin (HRIPT, repeated human patch test), when tested undiluted on 50 volunteers
- Non-mutagenic and non-pro-mutagenic (Ames test – OECD 471)
- No allergens (as per current EU Cosmetic Regulation)
- Non-irritating for eyes (BCOP – OECD 437) when tested undiluted

References

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Regulatory *(Further regulatory documents upon request)*

Origin	Hydrolyzed Pinus Sibirica Seedcake: Russia (Siberia)* Acanthopanax Senticosus (Eleuthero) Root: China*
INCI	Glycerin, Water, Lecithin, Hydrolyzed Pinus Sibirica Seedcake Extract, Acanthopanax Senticosus (Eleuthero) Root Extract, Pentylene Glycol, Sodium Hydroxide, Tocopherol
EU Cosmetic Regulation	The product complies to the EU Cosmetic Regulation (EC) No 1223/2009.
China INCI	All INCI are listed in the current Inventory of Existing Cosmetic Ingredient China (IECIC).
EU REACH	The product, i.e. its substances, conforms to the Regulation (EC) No 1907/2006.
China REACH	All ingredients are listed in the current Inventory of Existing Chemical Substances China (IECSC).
CMR	The product is not known to contain substances classified as CMR under the Regulation (EC) No 1272/2008 (CLP).
ABS	The plant materials fully comply with the requirements of Access and Benefit Sharing (ABS) as derived from the Nagoya Protocol.
COSMOS	PhytoCodine® is a raw material approved by ECOCERT Greenlife that conforms to the COSMOS Standard. The raw material is of 100 % natural origin.
Halal	The product conforms to HALAL requirements.
Vegan	The product can be used in vegan formulations.
Non-GMO	The product is non-GMO. It meets the non-GMO standards set by Regulation (EC) No 1829/2003 and EC (No) 1830/2003.
Palm oil	The product does not contain palm (kernel) oil or its derivatives.



**Not part of the specification*

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Disclaimer: Please be aware that the listed properties (medicinal or otherwise) that have been sourced from literature should be understood as value-added information only. No proof of statements by testing or otherwise will be provided by Lipoid Kosmetik AG (this excludes test data generated by Lipoid Kosmetik AG in support of our specific actives range). Other product properties identified and highlighted by specific tests or studies are to be interpreted in the context of the test/study conditions only. Product properties mentioned herein going beyond the product specifications are applicable unless the inherent uncertainty regarding the availability of herbal raw material (or its derivatives) compels a modification. Please be aware that the use of any claim on cosmetic products is the sole responsibility of the customer and is regulated by your local regulatory body.