

PEPTAN[®] FOR BEAUTY FROM THE INSIDE AND OUT



Collagen Peptides for a Healthy Lifestyle

PRODUCED & MARKETED BY ROUSSELOT

Peptan[®]

DARLING
INGREDIENTS



‘Beauty from within’ solutions are in global demand

The market for skin beauty products is hot, with ‘Beauty From Within’ solutions taking on a leading role. Sustained for many years by Asian – especially Japanese. Demand for ingestible beauty products, or nutricosmetics, is now rapidly spreading across the globe, as consumers everywhere gain more and more confidence in their proven benefits. By 2020 the market for nutricosmetics is expected to reach an estimated value of USD 7.4 billion¹.

A healthy lifestyle with great – and lasting – looks

In Japan, for example, a daily dose of collagen peptides has long been recognized as a vital contributor to anti-aging effects and great looks. Today, science is increasingly affirming this timeless philosophy. The lines between wellness and beauty are blurring, as consumers increasingly appreciate the fact that a healthy lifestyle, including the right nutrition, can help us feel better and look better, too. Surveys show that consumers today understand that beautiful skin on the outside requires a healthy foundation on the inside – and that they are consequently taking a more holistic approach to their health regimes². The opportunities for manufacturers of nutricosmetics are greater than ever.

Scientific evidence of beauty benefits means long-term success

As this market expands, research into ingredients that will support consumers in their wellness and beauty pursuits has intensified. This is leading manufacturers (and users) of nutricosmetics to place ever higher demands on the benefits as well as the quality, safety and natural origins of the ingredients they use – and on the science behind it all. Doing the science, in fact, is one of the secrets to dependable, lasting results in skin beauty solutions.

A powerful anti-aging ingredient fights against the visible signs of aging

The star player in the arena of ingestible beauty ingredients

In the arena of ingestible beauty products, collagen has long been recognized as the star player. Research shows that collagen is now the leading functional ingredient of beauty products in all regions of the world .

The bad news for beauty: our collagen production wanes as we grow older

Collagen is the most abundant protein in the human body, constituting 70% of our dry-mass skin content¹. A key component of the skin's structure, collagen fibers provide the infrastructure for elastin, which maintains skin elasticity, and for hyaluronic acid, which holds moisture. As we age, both the number and the activity of skin cells (fibroblasts) that produce

Illustration of skin structure



collagen decrease. The collagen matrix that provides skin firmness and structure starts to break down and our skin becomes dehydrated and thinner, with fine lines, wrinkles and deeper furrows start to appear...

The good news: the right nutrition can make skin look younger and more beautiful

Scientific research has proven that nutrition can vitally influence our skin's elasticity, firmness and moisture-binding capacity by contributing to optimum levels of well-organized collagen fibers. Collagen peptides, in particular, have proven skin beauty benefits, contributing to a healthier, younger-looking skin.

Peptan, the leading collagen peptide brand with proven anti-aging skin benefits

Peptan's beneficial effects on skin beauty have been proven in double-blind, randomized, placebo-controlled clinical studies. These effects were published in an edition of the Journal of Cosmetic Dermatology – the first ever publication of data to present skin restructuring effects as a result of the intake of a nutraceutical ingredient⁵.

¹ The Global Nutricosmetics Market: Trends, Drivers & Projections, Global Industry Analysts Inc., 2015.

² Dryza, Deep Beauty. VANVAS8. Report, 2012.

³ Innova, trends in nutricosmetics, 2016

⁴ Gniadecka, M. et al. 1998. Water and Protein Structure in Photoaged and Chronically Aged Skin. J Investig Dermatol Journal of Investigative Dermatology, 111(6), 1129-1132

Science's answer to skin dehydration, wrinkles and sagging

Peptan, the bioactive ingredient for rejuvenation and hydration

Research has confirmed how collagen peptides help strengthen and rejuvenate the deeper skin layers from within, maintaining the cohesive and dense collagen network that is key to preventing wrinkles and sagging. Peptan collagen peptides also have a significant effect on skin hydration. Maintaining a well-hydrated skin is crucial for a smooth, healthy-looking skin and prevents the formation of micro relief wrinkles. In this section, we invite you to take a closer look at the science behind skin beauty.

▪ Restructuring the skin's collagen network from within

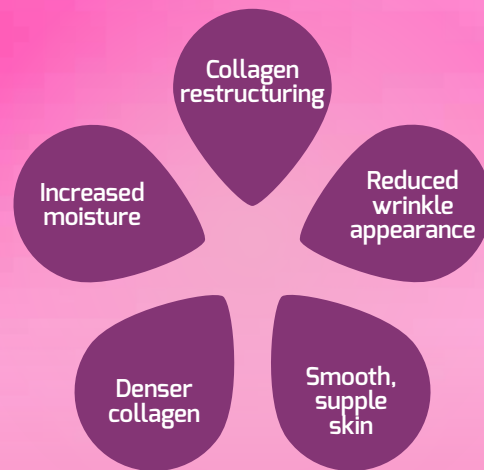
As our skin ages and responds to external conditions, like sunlight, the collagen in the dermis begins to get damaged and fragmented. This can hinder collagen synthesis and elastin production, leading to a loss of elasticity and a reduction of the skin's total collagen density. With Peptan, you can create solutions that will counter these effects.

▪ Visible effects after just one month of use

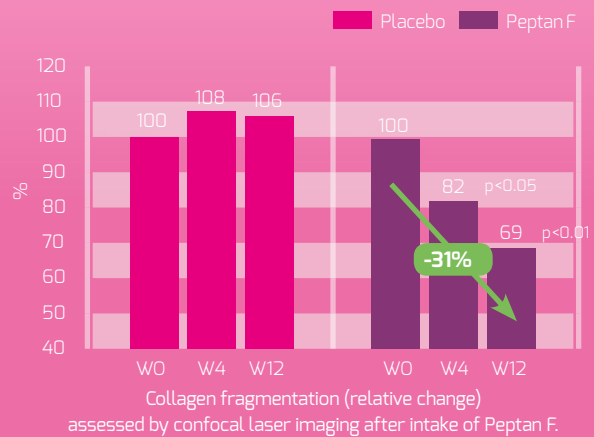
As one of the most extensively researched collagen peptides brands available on the market, Peptan's multiple anti-aging benefits are well-documented. In several clinical studies, visible skin health and beauty effects have been demonstrated after just one month of use^{5,6}.

⁵ Asserin, J. et al. 2015. The effect of oral collagen peptide supplementation on skin moisture and the dermal collagen network: evidence from an ex vivo model and randomized, placebo-controlled clinical trials. *Journal of Cosmetic Dermatology*, doi: 10.1111/jocd.12174

⁶ Borumand, M. et al. 2014. Daily consumption of the collagen supplement Pure Gold Collagen® reduces visible signs of aging. *Clinical Interventions in Aging*, 9:1747-1758



Decrease in collagen fragmentation after intake of Peptan F at week 0, 4 and 12



Asserin 2015

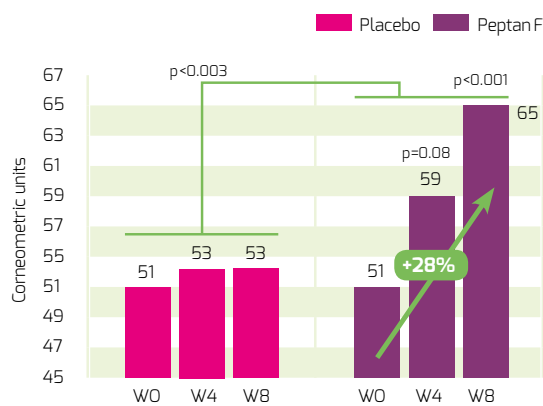


Enhancing skin hydration

Environmental pollution, aging and harmful ultraviolet rays can damage collagen fibers, limit hyaluronic acid production and decrease water content in our skin. This dehydration can cause it to look tired and wrinkled. A daily dose of Peptan can increase not only the skin's collagen density, but also its moisture levels, while decreasing and plumping wrinkles.

A double-blind, placebo-controlled trial of Peptan collagen peptides among 33 women (aged 40-59) by Souken in Japan⁵ showed that Peptan increased skin hydration by 28% after eight weeks. 91% of this research group reported a higher skin hydration level during the same period.

Skin hydration in the Peptan test group improved by 28% compared to placebo



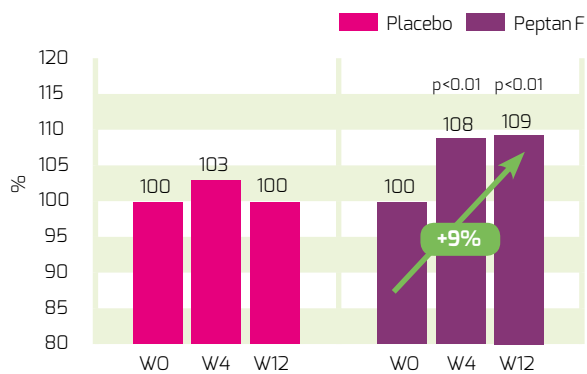
Skin moisture level increase - Corneometer[®] measurement.

Asserin 2015

Less deep-layer defragmentation, higher collagen density

A randomized, placebo-controlled, double-blind clinical trial by COSderma in France⁵ involving 106 women, showed that after just four weeks of Peptan F consumption (fish origin collagen peptides), collagen fragmentation decreased significantly (by 18%) in the deep layers of the skin. After 12 weeks of Peptan F intake, there was a 31% reduction. The same study showed a 9% increase of the density of collagen in the dermis after four weeks of Peptan intake.

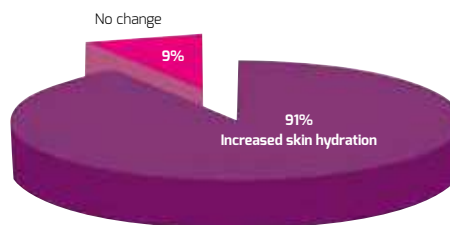
Increase in collagen density after intake of Peptan F at week 0, 4 and 12



Collagen density (relative change) assessed by echography after intake of Peptan F.

Asserin 2015

Moisturising effect was observed in 91% of the Peptan group of women



Skin hydration level - Corneometer[®] measurement.

Asserin 2015

Immediate results with Peptan as an active ingredient

A recent skin study, in which a group of individuals took Peptan as an active ingredient in a nutritional supplement (under the brand name Gold Collagen), showed a positive anti-aging effect on their skin, with fewer wrinkles and an increase in skin moisture and collagen density⁶.

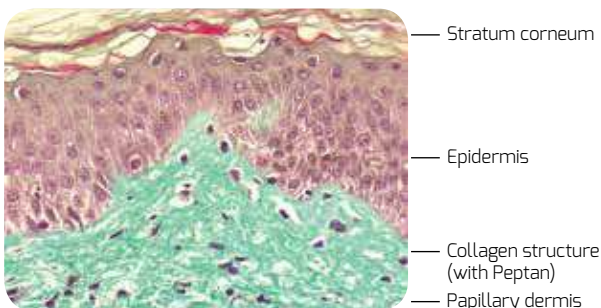


How Peptan works: the mechanism behind skin beauty

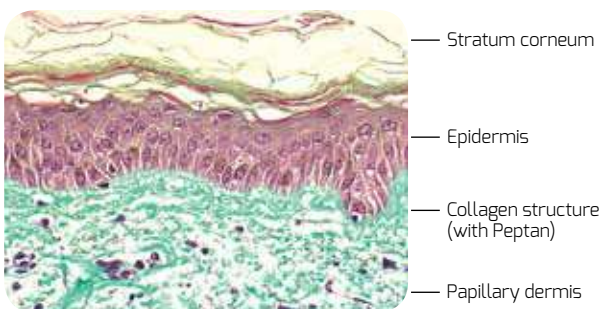
One Peptan, multiple skin benefits

Thanks to the latest research, we understand today better the unique mechanisms behind Peptan. We know enough today to understand the vital mechanisms behind it. Key findings include the fact that ingesting collagen peptides can improve several skin properties, such as elasticity and smoothness, and significantly increase skin hydration.

Morphology of a skin explant sample treated with Peptan. The density of the collagen fibers (green color) is enhanced.



The untreated control explant sample with less dense coloration due to less collagen present.



■ Giving the body a clear message

After consuming Peptan, small hydroxyproline-containing peptides appear in the blood stream. Scientists believe these give off a false signal, suggesting to the body that its own collagen is being destroyed. Thus collagen peptides may act as a messenger, triggering the synthesis and reorganization of new collagen fibers by stimulating fibroblast cells^{7,8,9}.

■ Stimulating the expression of elastin and GAGs

Peptan have also been shown to stimulate the expression of elastin and glycosaminoglycans (GAGs), such as hyaluronic acid (HA)^{8,9}. Studies have shown collagen peptides to improve skin elasticity and dermis echogenicity^{10,11}. Ex-vivo skin studies using histological techniques have confirmed increased collagen and GAG production in the dermis, following the addition of Peptan to the skin explants' culture medium⁵.

■ Improving the skin's mechanical strength

Additional studies have shown that collagen peptides can enhance the fibroblast density and the thickness of collagen fibrils in the dermis and may improve the mechanical strength of the skin by increasing the decorin ratio^{12,13}.



Peptan's high bioavailability and bioactivity means immediate, maximum benefits

Peptan collagen peptides are optimized for high bioavailability and bioactivity. This means they quickly reach the parts of the body where they are most needed – and with maximum effect. In fact, 90% of Peptan collagen peptides are digested and available within the connective tissues just a few hours after digestion. From the blood, the peptides – containing hydroxyproline, a unique amino acid – are transported into the target tissues, where they act as building blocks for the local cells and help boost the production of new collagen fibers¹⁴.

References:

- ⁷ Postlethwaite, A. E., et al. 1978. Chemotactic attraction of human fibroblasts to type I, II, and III collagens and collagen-derived peptides. *Proceedings of the National Academy of Sciences*, 75(2), 871-875.
- ⁸ Shigemura, Y., et al. 2009. Effect of Prolyl-hydroxyproline (Pro-Hyp), a Food-Derived Collagen Peptide in Human Blood, on Growth of Fibroblasts from Mouse Skin. *J. Agric. Food Chem. Journal of Agricultural and Food Chemistry*, 57(2), 444-449.
- ⁹ Ohara, H., et al. 2010. Effects of Pro-Hyp, a Collagen Hydrolysate-Derived Peptide, on Hyaluronic Acid Synthesis Using In Vitro Cultured Synovium Cells and Oral Ingestion of Collagen Hydrolysates in a Guinea Pig Model of Osteoarthritis. *Bioscience, Biotechnology, and Biochemistry*, 74(10), 2096-2099.
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- ¹¹ Matsumoto, et al. 2006. Clinical effects of fish type I collagen hydrolysate on skin properties. *ITE Letters on Batteries, New Technologies and Medicine* 7 (4): 386-390
- ¹² Matsuda, N., et al. 2006. Effects of Ingestion of Collagen Peptide on Collagen Fibrils and Glycosaminoglycans in the Dermis. *Journal of Nutritional Science and Vitaminology*, 52(3), 211-215.
- ¹³ Liang, J., et al. 2010. The Protective Effects of Long-Term Oral Administration of Marine Collagen Hydrolysate from Chum Salmon on Collagen Matrix Homeostasis in the Chronological Aged Skin of Sprague-Dawley Male Rats. *Journal of Food Science*, 75(8).
- ¹⁴ Watanabe-Kamiyama, M., et al. 2010. Absorption and Effectiveness of Orally Administered Low Molecular Weight Collagen Hydrolysate in Rats. *J. Agric. Food Chem. Journal of Agricultural and Food Chemistry*, 58(2), 835-841.

A safe, natural ingredient for effective nutricosmetics applications



A natural, bioactive protein and your active ingredient of choice

Peptan is a natural, bioactive protein carrying GRAS status (Generally Recognized as Safe, under the USA's Federal Food, Drug and Cosmetic Act). If you are a manufacturer seeking to tap into the growing 'Beauty From Within' market by formulating innovative and effective nutricosmetics products, using Peptan as your active ingredient is an obvious choice.

Neutral taste and odor, suitable for many applications

Neutral in taste, odor and color, you can use Peptan in a wide range of end products. Peptan F – fish collagen peptides – is today's most popular choice for nutricosmetic supplements and functional foods.



Dairy



Powder drinks



Beverages



Tablets and capsules



Nutritional bars



Confectionery



Maximum convenience for consumers with a hectic lifestyle

Peptan also offers you the benefit of being easy to integrate in your applications, including convenience and on-the-go concepts. This means you can cater to the growing numbers of consumers demanding more convenient and portable nutritional supplements to maintain their skin beauty. Popular beauty applications today include powder drinks, beauty beverages, bars, and gummies – all products that consumers can easily integrate in their hectic lifestyles.

Compatible with other skin beauty nutrients

You can also formulate Peptan with other skin beauty ingredients, such as vitamin C, biotin or zinc to achieve synergistic effects, offering your consumers perfect skin beauty positioning. A highly stable ingredient, Peptan offers excellent compatibility with other ingredients, while its heat resistance makes it suitable for use in long shelf-life beauty beverage applications.

Key characteristics

- Dust-free, white powder
- Specified density and particle size
- Instant solubility
- Transparent in liquid solution
- Low viscosity
- Neutral taste and odor
- Stable in a wide range of pH (3 to 7)
- Heat-stable
- Compatible with other active ingredients (vitamins, minerals etc.)

Peptan is the active ingredient of choice for efficient and trustworthy Beauty From Within solutions.

Benefit from our (co-)innovation, commitment & world-class expertise

With Peptan, you will have a reliable, closely connected partner

Our global leadership in collagen peptides, combined with our worldwide presence and customer-centric culture, enables us to be a closely connected, reliable partner to you as a manufacturer.

We can help you with virtually any product requirement or innovation you have in mind.



1. Trustworthy, up-to-date science

Peptan offers proven efficacy in extensive in vitro, in vivo and double blind, placebo controlled clinical studies and is recognized worldwide for its unrivalled scientific backing.

We'll help you communicate the science, too.

2. Quality & safety

Peptan is manufactured in-house in state-of-the-art certified plants which meet the highest international food quality standards and ensure traceability of products and processes. A premium quality collagen peptide, Peptan is free from preservatives or additives.

Full control from source to final product.

3. Formulation optimization

Peptan Application Centers develop new product formulation concepts and share ideas and recipes. We facilitate the optimal use of Peptan in your applications.

We can help get your product faster to market.

4. Co-innovation

Global network of experts are available to help you develop successful, marketable product innovations with Peptan -- we are happy to co-innovate with you.

Join our Innovation Day to gain insights of the latest marketable innovations.

5. Brand development

We also offer outstanding brand development support. You can benefit from endorsement by Peptan branding and the opportunity to list Peptan as one of the ingredients used in your product.

Contact us to know more about our co-branding program.



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About Rousselot and Peptan:

Rousselot and Peptan are both¹ brands of Darling Ingredients Inc. Rousselot is the global leader of gelatin and collagen peptides. Rousselot's wide range of collagen peptides are marketed under the Peptan brand. We work in partnership with our customers all over the world, delivering innovative and advanced ingredient solutions manufactured through state of the art operations. We help our customers achieve their goals, enabling them to create world class pharmaceutical, food and nutritional products to inspire and excite today's demanding consumers.

¹ Grand View Research, Gelatin Market Analysis and Segments Forecasts to 2024, 2014

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