SUMMARY

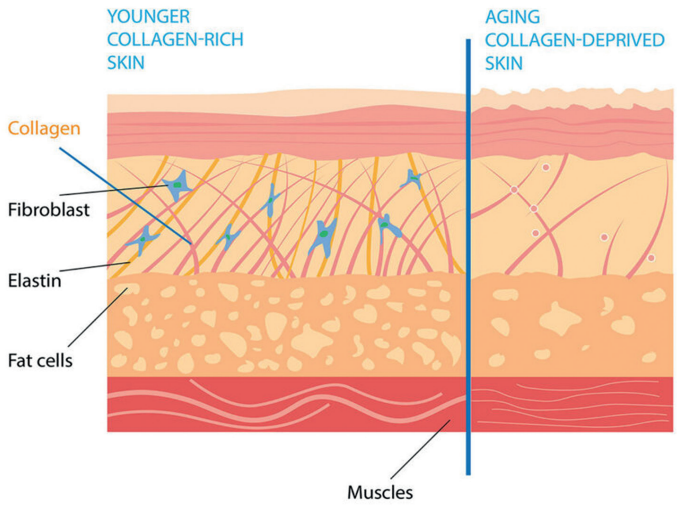
— Collagen hydrolysate is a popular dietary supplement as demand grows for evidence-based food ingredients that support skin beauty and health and counteract aging
— A body of literature confirms bioavailability and beneficial effects of collagen hydrolysate on skin hydration and density, wrinkle reduction, and healing of UV-damage and wounds
— Collagen hydrolysate is a safe nutricosmetic for flexible daily use

EFFECTS OF COLLAGEN HYDROLYSATE ON SKIN HEALTH & BEAUTY

Scientific and clinical observations support benefits of daily supplementation

In recent years, collagen hydrolysate (CH) has become a popular dietary supplement as a growing number of consumers pursues an active, healthy lifestyle and aims to counteract the effects of aging. In particular, CH has been discussed as a nutricosmetic that reduces wrinkles, increases skin elasticity, improves hydration, and also promotes wound healing.

Collagen is a major structural component of connective tissues and one of the most abundant proteins in the human body (≈ 30%). It sustains tendons, skin and cartilage, thereby supporting integrity, firmness and elasticity of the musculo-skeletal system, soft tissues and skin.[1]



Aging processes can lead to a loss of collagen in the dermis and a deterioration of skin health and appearance. Dermatological disorders, environmental conditions and intrinsic aging process contribute to skin damage and may be accelerated by extrinsic components, e.g. chronic sun exposure, diet, alcohol, smoking, stress, and lack of sleep. These factors can cause wrinkles, the appearance of brown spots and thickening of the skin.[2]

CH are hydrolyzed collagen peptides with a molecular weight distribution of approximately 3 kDa. During production, collagen fibers are extracted from collagen-rich animal tissues such as bovine hide and subjected to a multi-step process that involves gelatinization and subsequent enzymatic hydrolysis.

This short review provides a brief overview of bioavailability and the effects of CH as nutritional supplement on skin health and beauty as has been evaluated in studies and clinical trials.

KEYWORDS

Collagen hydrolysate, collagen peptides, ageing, wrinkles, skin health, UV damage, beauty, nutricosmetics, nutraceuticals.

BIOAVAILABILITY OF COLLAGEN HYDROLYSATE

Several studies show that collagen peptides have a bioavailability of 82% at six hours[3] and 95% at 12 hours after ingestion.[4] The latter in vivo study in mice has traced hydolyzed collagen absorption with radioactive Carbon-14 (^{14}C), documenting the uptake of peptides in the gastrointestinal tract, their passage into the blood stream, and stable deposition in muscles, bones and cartilage.[4,5]

In a recent study, Yazaki et al. identified 17 different collagen-derived peptides in blood plasma after CH ingestion, mainly Gly-Pro-Hyp.[6]

SKIN HYDRATION & WRINKLE REDUCTION

Two studies were conducted to evaluate the effect of collagen peptides on skin hydration and deep wrinkle reduction. The first was a double-blind, randomized, placebo-controlled clinical trial

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including 33 women, age 40-59 with normal to dry skin. After ingestion of 10 g hydrolyzed collagen daily for eight weeks, a 28% increase in skin hydration was observed.[2] The second study involved 47 women between 35-55 years of age with normal to dry skin. Deep wrinkles decreased by 30% in this group after an intake of 10 g collagen for a period of 12 weeks.[2]

A clinical study by Proksch et al. showed that a daily dose of 2.5 g CH for eight weeks reduced the volume of wrinkles around the eye and increased the levels of procollagen type I and elastin, demonstrating a positive longer-lasting effect of the supplement. The placebo-controlled trial included 114 women age 45 to 65 years.[7]

De Miranda et al. evaluated the effects of CH supplementation on skin aging based on a meta-analysis of 19 clinical trials. The authors found evidence for an improvement of wrinkles, hydration status and elasticity as a result of CH supplementation and conclude that the ingestion of CH for 90 days is effective in reducing skin aging.[8]

Another clinical trial studied the effect of collagen peptides on skin hydration, density, and collagen fragmentation. At four weeks of treatment, an increase in the density of collagen in the dermis and a decrease in the fragmentation of the dermal collagen network was observed. After eight weeks, there was also an increase in skin hydration, and after 12 weeks the effects remained. In parallel, an *ex vivo* study was carried out which showed that not only collagen was produced during this period, but also glycosaminoglycan, another important component of the collagen dermal network.[9]

UV DAMAGE & WOUND HEALING

Collagen peptides have also been shown to reduce dermal UV damage in mice. Tanaka et al. examined the effect of daily ingestion of collagen peptide on the skin damage of mice induced by repeated UV-B irradiation. A daily intake of 0.2 g/kg for six weeks suppressed UV-B-induced decrease in skin hydration, epidermal hyperplasia and type I collagen decrease. The authors conclude that collagen peptides food supplements are beneficial to suppress UV-B-induced skin damage and photo-aging.[10]

Miyab et al. conducted a randomized double-blind controlled trial with 31 men, age 18-60 years, who had 20-30% of their body surface burned. They received CH as a daily supplement for a period of four weeks. This treatment significantly improved wound healing and circulating pre-albumin, and reduced hospital stay.[11]

FINAL REMARKS

Collagen is an essential component of the skin that supports its flexibility, firmness and elasticity. The reduction of collagen levels during aging contributes to wrinkle formation, dry skin and a reduced healing ability. The trend of recent years has shown that there is a great demand for evidence-based nutricosmetics, in particular for CH dietary supplements.

As shown in this review, there is a substantial body of literature that supports efficacy and benefits of collagen peptides on the skin, such as improving hydration and elasticity, reducing wrinkles, and overall slowing the effects of aging.

CH is a safe food ingredient that offers a wealth of possibilities for daily use regarding final dosage form and formulations.

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