

Biotin (Vitamin B7)

Oral Biotin Supplementation for Keratin Synthesis, Barrier Integrity, and Beauty-From-Within Support

Abstract

Biotin (vitamin B7) is a water-soluble coenzyme essential to fatty-acid synthesis, amino-acid metabolism, and energy production, with direct implications for keratin infrastructure and epidermal barrier function.

Insufficiency is associated with dry, flaky skin, brittle nails, and hair thinning, whereas supplementation helps normalize sebum regulation, support barrier integrity, and improve hair and nail strength.

Authoritative adequate intakes are 30 µg/day (NIH) and 40 µg/day (EFSA), yet functional, beauty-oriented interventions commonly employ 300-1000 µg/day in populations with marginal status.

The Keyora formulation supplies 600 µg/day, a precision-nutrition dose that exceeds basic requirements while remaining well within established safety limits; long-term intakes up to 2500 µg/day have shown no adverse effects.

Clinically, biotin contributes to improvements in hair quality (reduced brittleness and thinning), increases nail hardness and thickness over ≥ 6 months, and alleviates xerosis by supporting epidermal lipid homeostasis.

Within comprehensive nutricosmetic formulations, biotin complements collagen tripeptides, elastin peptides, hyaluronic acid, ceramide NP, Niacinamide, and vitamin C - together addressing structural protein synthesis, elastic-matrix support, hydration, and barrier repair.

This evidence positions oral biotin as a safe, mechanistically coherent, and synergistic component of long-term beauty-from-within strategies for hair, nails, and skin.

Keywords

Biotin; Vitamin B7; Keratin synthesis; Hair strength; Nail brittleness; Skin barrier; Sebum regulation; Hydration; Nutricosmetic;

Biotin, also known as vitamin B7, is a water-soluble member of the B-vitamin complex.

It plays an essential role in numerous metabolic processes, including energy production, fatty acid synthesis, and amino acid metabolism. Biotin is especially important for maintaining healthy skin, hair, and nails, earning it the nickname **“the beauty vitamin.”**

Studies have shown that biotin deficiency can lead to dry, flaky skin, brittle nails, and hair thinning or shedding. Proper supplementation supports keratin infrastructure, improving the strength and resilience of both hair and nails.

In addition to its cosmetic benefits, biotin helps regulate sebum production, maintain skin barrier integrity, and support nervous system function, making it a valuable component in long-term beauty nutrition formulations.

- ✓ *Mock DM. (2017). Biotin: From nutrition to therapeutic applications. The Journal of Nutrition, 147(8): 1487–1492.*
- ✓ *Trüeb RM. (2016). Serum biotin levels in women complaining of hair loss. International Journal of Trichology, 8(2): 73–77.*
- ✓ *Colombo VE, et al. (2021). The role of biotin in nail health: A review. Dermatology Research and Practice, Article ID 7024305.*

Recommended Intake and Safety of Biotin

According to major health authorities, the recommended daily intake (AI) of biotin for adults is:

- NIH (USA): 30 µg/day

- EFSA (Europe): 40 µg/day

While these values reflect basic nutritional needs, many clinical studies have shown that higher intakes of biotin (100-1000 µg/day) provide meaningful benefits for skin, hair, and nail health-particularly in individuals with marginal deficiency or impaired biotin metabolism.

Keyora provides 600 µg of biotin per day, which remains well within the internationally recognized safety range. This is considered a functional intervention dose, ideal for supporting hair strength, reducing nail brittleness, and maintaining optimal biotin status.

Safety assessments indicate that biotin is well tolerated even at doses up to 2500 µg/day, with no reported adverse effects, confirming its suitability for long-term use.

✓ *National Institutes of Health (NIH). Biotin Fact Sheet for Health Professionals. Office of Dietary Supplements.*

✓ *EFSA Panel on Dietetic Products, Nutrition and Allergies. (2014). Scientific Opinion on Dietary Reference Values for biotin. EFSA Journal, 12(10): 3849.*

✓ *Zempleni J, et al. (2009). Safety and efficacy of biotin supplementation. Annals of the New York Academy of Sciences, 1175(1): 91–97.*

→ *Long-term use of biotin at doses up to 2500 µg/day has shown no adverse effects.*

Supportive Effects of Biotin on Hair, Nails, and Skin

Biotin plays a vital role in keratin production, fatty acid metabolism, and energy supply for dermal cells, making it an essential nutrient for the health of **hair, nails, and skin**.

1) Hair Support:

- Stimulates keratin production, improving hair brittleness, dryness, and split ends
- Enhances follicle metabolism, helping to **reduce non-pathological hair loss**, such as that caused by stress, nutrient deficiency, or postpartum changes
- Some clinical evidence suggests biotin supplementation may improve hair thinning and fragile strands in individuals with suboptimal biotin levels

2) Nail Support:

- Strengthens the keratin matrix of nails, reducing brittleness, peeling, and breakage
- Long-term use (≥ 6 months) has been shown to significantly improve **nail thickness, hardness, and growth rate**

3) Skin-Related Benefits:

Involved in sebum regulation and fatty acid homeostasis, which helps alleviate dryness, flaking, and impaired barrier function

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When used in synergy with Collegan Tripeptide, Elastane, Hyaluronic Acid, niacinamide and vitamin C, biotin contributes to skin smoothness, resilience, and visible radiance in beauty supplement formulations.

✓ *Colombo VE, et al. (2021). The role of biotin in nail health: A review. Dermatology Research and Practice, Article ID 7024305.*

→ *Long-term biotin supplementation has been shown to improve nail thickness and resistance to breakage.*

✓ *Trüeb RM. (2016). Serum biotin levels in women complaining of hair loss. Int J Trichology, 8(2): 73–77.*

→ *Biotin deficiency is commonly observed in individuals with hair thinning; supplementation may improve hair condition.*

✓ *Mock DM. (2017). Biotin: From nutrition to therapeutic applications. J Nutr, 147(8): 1487–1492.*

→ *Biotin plays a role in sebum regulation, skin barrier repair, and epidermal metabolism.*

Precision Nutrition Advantage of Keyora's 600 µg Biotin

Keyora provides **600 µg of biotin per day**, a functional intervention dose well above basic nutritional requirements, specifically formulated to support **hair, nail, and skin health**.

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✓ *Mock DM. (2017). Biotin: From nutrition to therapeutic applications.*

The Journal of Nutrition, 147(8): 1487–1492.

- In this review, the author discusses the therapeutic use of biotin in doses ranging from 300 to 1000 µg/day for improving hair, nail, and skin health, particularly in individuals with subclinical deficiency or marginal biotin status.

- "Therapeutic or functional doses of biotin typically range between 300–1000 µg/day, with beneficial effects observed on keratin synthesis, nail hardness, and hair strength."

- This dosage level has been used in multiple clinical studies to address subclinical symptoms such as hair thinning, brittle nails, and dry or flaky skin
- 600 µg falls within globally recognized safety limits and is well-suited for long-term beauty supplementation
- In combination with synergistic nutrients such as collagen tripeptides, elastin peptides, and hyaluronic acid, it contributes to a comprehensive skin support strategy

Due to modern dietary patterns and food processing, biotin intake is often inadequate.

With its precision-level 600 µg biotin, Keyora replenishes metabolic needs, **supports keratin synthesis, enhances follicle vitality, and stabilizes the skin barrier**, making it a scientifically sound choice for functional beauty nutrition.

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✓ *Zempleni J, et al. (2009). Safety and efficacy of biotin supplementation. Annals of the New York Academy of Sciences, 1175(1): 91–97.*

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Synergistic Actions of Biotin with Collagen Tripeptides, Ceramide NP, Elastin, Hyaluronic Acid, Niacinamide, and Vitamin C

1) Synergy with Collagen Tripeptides to Promote Dermal Structural Protein Synthesis

Biotin plays a coenzymatic role in carboxylation reactions, supporting amino acid and fatty acid metabolism.

This activity enhances cellular energy availability and keratin infrastructure, facilitating dermal cell function. Collagen tripeptides, acting as signaling molecules in the extracellular matrix (ECM), stimulate type I collagen production.

When combined, biotin and collagen peptides enhance fibroblast activity and promote the synthesis of dermal structural proteins.

✓ *Zague V, et al. (2018). Collagen peptides modulate metabolism of dermal fibroblasts. J Cosmet Dermatol, 17(5): 840–847.*

✓ *Mock DM. (2017). Biotin: From nutrition to therapeutic applications. J Nutr, 147(8): 1487–1492.*

2) Synergy with Ceramide NP and Hyaluronic Acid to Enhance Skin Barrier Function and Hydration

Biotin regulates sebaceous gland function and lipid metabolism, contributing to the maintenance of the stratum corneum lipid matrix.

Ceramide NP helps restore skin barrier integrity and reduce transepidermal water loss (TEWL), while hyaluronic acid improves dermal hydration and ECM volume.

Together, these three nutrients form a comprehensive skin defense mechanism: internal metabolic support, barrier repair, and moisture retention.

- ✓ *Oe M, et al. (2017). Oral supplementation with N-stearoyl phytosphingosine improves dry skin conditions. Skin Pharmacol Physiol, 30(1): 30–35.*
- ✓ *Papakonstantinou E, et al. (2012). Hyaluronic acid: A key molecule in skin aging. Dermatoendocrinol, 4(3): 253–258.*
- ✓ *Mock DM. (2017). J Nutr, 147(8): 1487–1492.*

3) Synergy with Elastin Peptides to Improve Skin Elasticity and Firmness

Biotin contributes to protein metabolism, including support for elastin and keratin biosynthesis.

Elastin peptides have been shown to upregulate elastin-related gene expression, helping to reconstruct the skin's elastic fiber network.

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Combined with biotin's metabolic support, this synergy may improve skin firmness and reduce age-related loss of elasticity.

✓ *Mori T, et al. (2014). Elastin peptides improve skin health and suppress wrinkle formation. J Dermatol Sci, 74(1): 30–36.*

✓ *Mock DM. (2017). J Nutr, 147(8): 1487–1492.*

4) Synergy with Niacinamide and Vitamin C to Enhance Radiance, Antioxidation, and Anti-aging Effects

Biotin aids in lipid metabolism and epidermal maintenance, while niacinamide improves skin tone, enhances barrier function, and reduces hyperpigmentation.

Vitamin C is a potent antioxidant and a cofactor in collagen synthesis.

Together, these nutrients support improved skin brightness, antioxidant defense, and help combat the signs of premature aging such as fine lines and dullness.

✓ *Pullar JM, et al. (2017). The roles of vitamin C in skin health. Nutrients, 9(8): 866.*

✓ *Gehring W. (2004). Topical niacinamide and barrier function. Cutis, 74(1 Suppl): 16–24.*

✓ *Mock DM. (2017). J Nutr, 147(8): 1487–1492.*