

## Biotin on Nail and Hair Growth

### Introduction:

The beauty of the nails is defined by their shape, size, shine, consistency, integrity of the periungual tissues. The nail shape can be disbalanced when it is too wide, too narrow, too flat, curved too much or visibly deformed.

Thinning hair and hair loss are common in both male and female, and no less demoralizing. Hormonal changes associated with pregnancy, childbirth, discontinuing the use of birth control pills, and menopause can cause temporary hair loss. Medical conditions that can cause hair loss include thyroid disease, alopecia areata (an autoimmune disease that attacks hair follicles), and scalp infections like ringworm. In many cases, there are ways to treat both male and female hair loss.

Biotin is often called the “hair and nail vitamin”.

Biotin, also known as Vitamin B7, is a water soluble B-complex vitamin often found in multi vitamins, prenatal vitamins and dietary supplements for hair, skin and nail growth. It's also known as vitamin H.

Biotin is necessary for cell growth. Biotin is often recommended for strengthening hair and nails. Hence, this promotes the growth of healthy hair and finger nails.

Health of a human's hair skin and nails comprising a daily intake comprising: (a) about 225 µg to about 750 µg biotin;

Biotin can help support the health of the skin, nerves, digestive track, metabolism, and cells. In one example, the biotin can be cultured.

Biotin is a water-soluble vitamin and an essential coenzyme for several important enzymes while zinc is an essential micronutrient that is responsible for the normal functioning of hundreds of enzymes. The use of these agents for hair loss is based on the observation that alopecia is one of many consequences associated with biotin and zinc deficiencies.

### Mechanism:

Biotin stimulates growth of body cells and related to hair growth. Biotin is a required cofactor for carboxylase enzymes that become activated once they are joined together by holocarboxylase synthase.

These enzyme complexes play an important role in multiple metabolic processes including gluconeogenesis, fatty acid synthesis, and amino acid catabolism. Biotin's function in protein synthesis and more specifically, in keratin production, explains its contribution to healthy nail and hair growth.

### Studies:

- In one case report, a child with alopecia due to zinc deficiency was administered a zinc supplement and her hair loss stopped in three weeks. Biotin deficiency leads to dry, irritated skin and cracking of nails.
  
- One study in women who had brittle nails or splitting of the nails (Onychoschizia) noted that oral supplementation of biotin at 2.5mg over the course of at least six months increased nail thickness by 25% (reaching normal/healthy control values). About half the group with brittle nails (4 of 8 subjects) also experienced reductions in nail splitting. All nails from biotin-treated individuals showed some improvement when assessed by electron microscopy. Biotin deficiency leads to complications with the skin, primarily seen as scaly and red (erythematous) dermatitis. Biotin protects the skin from acne, fungal infections, rashes, severe dryness and cracking of nails. One preliminary study has noted that, in four subjects being given chemotherapy (gefitinib or erlotinib) known to induce skin rashes, administration of biotin reduced the severity of the rash.
  
- **Biotin for the treatment of nail disease: what is the evidence?**

Lipner SR<sup>1</sup>, Scher RK<sup>1</sup>.

Author information

Abstract

AIM:

To describe the pharmacology, mechanism of action and clinical reports using biotin to treat nail conditions.

#### METHODS:

A review of articles indexed for MEDLINE on PubMed using keywords 'biotin' and 'nail' was performed and applicable articles were selected for review.

#### RESULTS:

Clinical trials have shown an improvement in firmness, hardness, and thickness of brittle nails with oral biotin. There are some case reports and series demonstrating that oral biotin may improve triangular worn down nails, trachyonychia, and habit tic nail deformity.

#### CONCLUSIONS:

Oral biotin has been used to treat several nail conditions with promising results. Further larger clinical trials with controls are necessary to determine efficacy and optimal dosing.

➤ **Brittle nails: response to daily biotin supplementation.**

Hochman LG<sup>1</sup>, Scher RK, Meyerson MS.

Author information

Abstract

A recent study from Switzerland demonstrated a 25 percent increase in nail plate thickness in patients with brittle nails who received biotin supplementation. Analysis of all visits to a nail consultation practice over a six-month period revealed forty-four patients with this condition who had been prescribed the B-complex vitamin biotin. Of these, thirty-five who took daily supplementation were subjectively evaluated. Twenty-two of thirty-five (63 percent) showed clinical improvement and thirteen (37 percent) reported no change in their condition. The results of this small, retrospective study suggest a positive response to biotin in the treatment of brittle nails in some patients.

➤ **Familial Uncombable Hair Syndrome: Ultrastructural Hair Study and Response to Biotin.**

Boccaletti V<sup>1</sup>, Zendri E, Giordano G, Gnetti L, De Panfilis G.

Author information

Abstract

We report a family affected to the fourth generation by uncombable hair syndrome. This syndrome is characterized by unruly, dry, blond hair with a tangled appearance. The family pedigree strongly supports the hypothesis of autosomal dominant inheritance; some members of the family had, apart from uncombable hair, minor signs of atopy and ectodermal dysplasia,

such as abnormalities of the nails. The diagnosis was confirmed by means of extensive scanning electron microscopy. A trial with oral biotin 5 mg/day was started on two young patients with excellent results as regards the hair appearance, although scanning electron microscopy did not show structural changes in the hair. After a 2-year-period of follow-up, hair normality was maintained without biotin, while nail fragility still required biotin supplementation for control.

### Formulation:

The below formulation has an enhanced whey protein concentrate that is combined with biotin specifically to aid the growth of hair and nails. Biotin is often recommended for strengthening hair and nails. Hence, this combination provides an excellent ingestible composition that promotes the growth of healthy hair and finger nails.

1. Whey protein – 72.6Kg
2. Chocolate flavor – 9.9Kg
3. Biotin 1% - 825 g
4. Potassium Iodide – 3.33 g
5. Niacinamide – 132 g
6. Folic acid 10% - 13.2g
7. PABA – 99g
8. Vitamin B5 – 303 g
9. Stevia – 330g
10. Zinc Oxide – 561 g
11. Xylitol – 13.2Kg
12. Manganese citrate – 66 g
13. Foti – 82.5 g
14. Kudzu Root – 66g
15. Pumpkin Seed – 33 g
16. Honey Suckle – 16.5g
17. Chrysanthemum flower – 16.5g
18. Silica – 3.3 g

19. L-Methionine – 3.3g
20. L-Cysteine - 99g
21. Vitamin B12 – 3g

**Procedure:**

Weigh items 1-21 and pour into mixer. Blend items 1-21 in mixer for 20 minutes.

mixing can also be carried out using granulation techniques including, but not limited to fluid bed granulation, Vertical granulation, high shear processing, extrusion and others processing techniques.

Efficacy of the formulation is established by clinical testing.

**Result:**

The test composition was shown to significantly improve perceived hair health, shine, hair loss, breakage, strength, length, growth rate, bounce, fullness and thickness for the majority of the subjects, all of whom had experienced hair loss.

Perceived nail quality also improved, with the majority of subjects reporting that their nails were stronger, longer, and healthier, had less breakage, and had faster growth.

**Conclusion:**

While biotin has proven benefits for hair and nail growth in people with biotin deficiencies. Biotin is one of several vitamins that play a role in the growth of healthier, thicker hair. One potential indicator for biotin deficiency is weak, brittle nails that crack easily.

Biotin isn't known to be toxic, meaning there are no negative effects to or other organs from taking a biotin supplement. Study data also shows that people can safely consume biotin at much higher levels than the adequate intake without any health problems.

**Reference:**

Dakshinamurti K, Triggs-Raine B: Biotin and Multiple Carboxylase Deficiency. Clinical Studies in Medical Biochemistry. Oxford University Press, 1997.



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