

# RootBioTec HO prevents hair loss – ensures fuller hair

## There are several causes of hair loss

The typical person has between 100,000 and 150,000 hairs on his or her head. In order to maintain a normal volume, hair must be replaced at the same rate at which it is lost and on average, one hundred strands of hair are normally lost over the course of a day. If this average number is clearly exceeded over a longer period of time then the individual is experiencing hair loss. The technical term for hair loss is alopecia and it can occur for a variety of reasons such as infections, thyroid and hormonal imbalances, nutritional deficiencies, stress, trauma, drugs, or it may result from an autoimmune phenomena.



Whilst many of these hair loss problems are temporary there is another type of hair loss that is less dramatic and less visible but can prove to be incredibly distressing. This involves the hair thinning gradually, which often takes place over the course of several decades. It can start at any age, it is progressive and it is hereditary. The condition is known as androgenic alopecia and is male hormone-related but it is not caused by excessive testosterone. Instead, the hair follicles become more sensitive to the hormone due to a genetic predisposition. An enzyme, 5 $\alpha$  reductase, leads to the conversion of the male sex hormone testosterone into the active form dihydrotestosterone (DHT). This hormone causes the hair follicles to produce thinner and smaller hair up until the point that the hairs actually stop growing.

### Women and men are affected – but in different ways

It is not only men but also women who can suffer from androgenic alopecia, although androgens are typically present in much smaller quantities. In fact, men are considerably more affected by

hair loss (statistics suggest up to 70%). Meanwhile, approximately 30 – 40% of women experience hair loss. In contrast to men, this occurs less in the area of the receding hairline or tonsure but instead appears on the top side of the head and through the spotty formation of gaps or diffuse hair loss.

### RootBioTec HO – an extract from basil, the king of herbs

Basil is a common name for the culinary herb *Ocimum basilicum*. The word comes from the Greek word *basileus*, which means “King”. Indeed, basil is considered to be the “King of Herbs” and plays an important role in both Italian and Asian cuisine. Basil contains high concentrations of essential oils and potent antioxidants with anti-ageing, anti-cancer, anti-viral and anti-microbial properties. Thanks to these valuable components, basil is also used for its medicinal properties in Ayurveda, the traditional medicinal system of India.

### RootBioTec – a novel technique developed to produce cosmetic actives

For the production of RootBioTec HO, Mibelle Biochemistry developed a novel sustainable technique to produce high amounts of valuable secondary metabolites of basil in bioreactors. This so-called ‘hairy roots’ technology is a type of plant tissue culture that is used to produce high quality, phytochemical compounds of pharmaceutical value under controlled conditions.

### RootBioTec HO inhibits 5 $\alpha$ reductase and stimulates hair follicles

5 $\alpha$  reductase II is the key target enzyme in the inhibition of hair loss. It is present in hair follicle cells and catalyzes the reduction of testosterone into the more potent androgen dihydrotestosterone (DHT), which has two to three times greater androgenic receptors affinity. RootBioTec HO demonstrated a clear concentration dependent inhibition of 5 $\alpha$  reductase II with an IC value of 2.62 mg/mL. Finasteride, which is an approved 5 $\alpha$  reductase inhibitor and synthetic drug for treating baldness in men, was used as a positive control.

Another study that was conducted involved human dermal papilla cells. These cells are located at the base of the hair follicle bulb and play an essential role in the control of hair growth. They are implicated in regulating the hair growth cycle and the production of hair fibre. And this is not only in the normal hair cycle but also in the pathogenesis of androgenic



alopecia. RootBioTec HO improved the proliferation of these cells by 23%, indicating a hair regrowth effect (Figure 1).

**Anti-hair loss effect**

The effect of RootBioTec HO against hair loss was evaluated on 19 woman and 2 men aged between 25 and 67 years who were suffering from mild to moderate hair loss (daily hair loss >100 strands). The volunteers applied a fluid containing 1% RootBioTec HO every evening for two months. After one and two months respectively, volunteers collected the hair that they lost through combing on three consecutive days. RootBioTec HO showed the capacity to reduce hair loss by 26% after the first month and 31% following the second month (Figure 2). Results suggest that RootBioTec HO significantly reduces hair loss and therefore leads to denser hair.

RootBioTec HO is a potent cosmetic active that is based on the herb basil and is produced with a novel sustainable technology, which makes the production of highly valuable plant metabolites under controlled conditions possible. RootBioTec HO tackles the problem of hair loss at the roots, stimulating the proliferating cells in the hair bulb to boost hair regrowth and at

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the same time inhibiting the hair loss enzyme 5 $\alpha$  reductase II. RootBioTec HO prevents hair loss in men and women and enables users to regain both fuller and denser hair.

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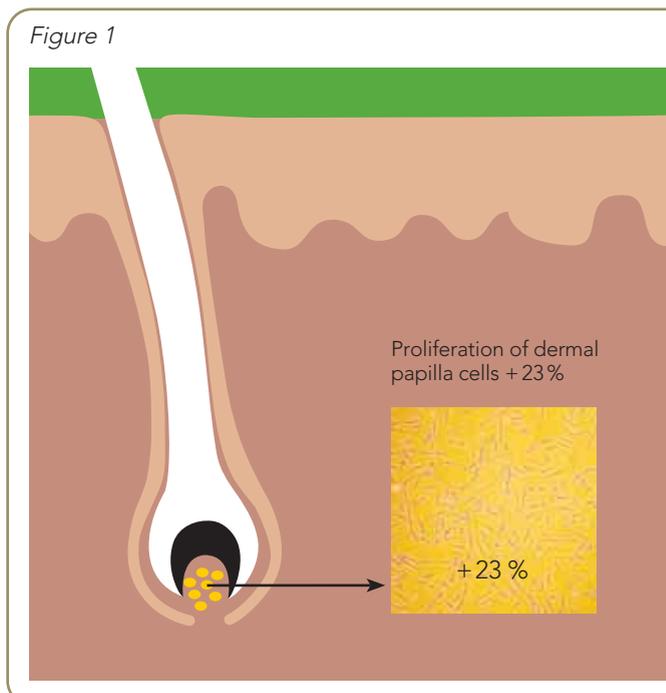


Figure 2

