



Bioboosting Feed: Biotin, Vitamin and Caffeine Boosting Delivery system.

The hair booster

Consumer needs

Men and women care about hair strength and growth

46% of men wish that their hair would be **thicker**.

26% of men worry about **hair loss** when shampooing their hair.

70% of men are affected by **hair loss**.



19% of females complain about **hair thinning**.

11% of females complain about a **lack of hair growth** and wish their hair would grow **faster**.

40% of women are affected by **hair loss**.

Biotin

An effective combination to boost your hair

Biotin

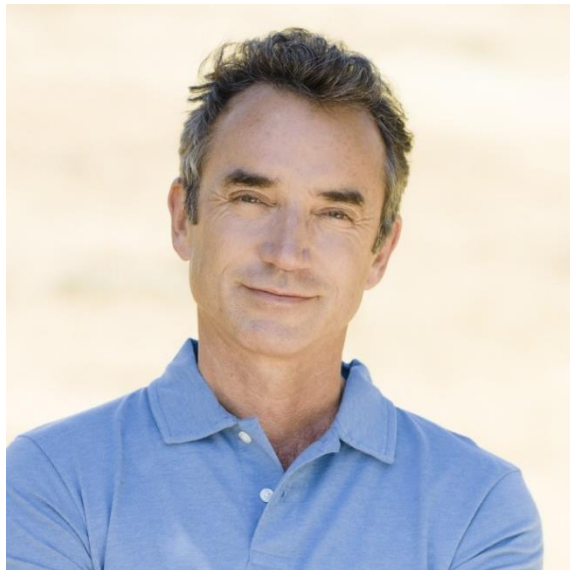
Metabolic processes of keratinocytes

Linoleic acid

Synthesis of ceramides 1 and 2, involved in the mechanical stability of the hair

D-Panthenol

Hair thickness and regeneration of damaged hair



Vitamin E

Decelerating keratin and hair pigments photooxidative decomposition

Caffeine

Microcirculation and supply of nutrients to hair and scalp



Biotin

Liposomally encapsulated combination of actives conducive to improved hair density and growth conditions.

Contributes to improve hair density, normalizing the ratio of anagen and telogen hair growth phases

Improved delivery of active ingredients into the scalp and hair root area

Provides visible and perceptible results

Bioboosting Feed

Composition and properties



A cosmetic delivery system based on liposomes to deliver vitamins and caffeine to the hair bulbs

INCI Water/Aqua; Alcohol; Panthenol;
Lecithin; Tocopheryl Acetate; Caffeine;
Biotin

Recommended usage level 2 - 10%

Appearance beige, viscous, fluid

Odor ethanolic, lecithin typical

China IECIC listed




How do we know?

Our studies

Bioavailability

Hair loss prevention

Our studies Summary

	<i>Ex vivo</i> bioavailability study	<i>In vivo</i> hair loss prevention study & self-assessment
Test area	<i>Ex vivo</i> skin	12 panelists (6 female, 6 male, aged 31 – 60)
Test formulation	Bioboosting feed delivery system loaded with hydrophilic and lipophilic fluorescent markers vs. unencapsulated markers at equivalent concentrations.	Hair tonic formulation with 10%
Time of measurement	Measurements after 8 and 16 hours of penetration	Start  24 weeks
Test design	Determination of penetration profile of hydrophilic fluorescent marker CF (6-Carboxyfluorescein) and lipophilic fluorescent marker DiL* into the skin and hair root area using confocal laser scanning microscopy on cross-sectional cuts of skin biopsies.	Application once daily over 24 weeks. After 6, 12 and 18 weeks measurement of ratio of anagen to telogen phase hair and hair density supported by photo-documentation. Panelist self-assessment on cosmetic acceptance, efficacy and tolerance after 24 weeks.
Results	enhances the bioavailability of hydrophilic and lipophilic actives for hair care applications. <small>* IUPAC name: (2Z)-2-[(E)-3-(3,3-dimethyl-1-octadecylindol-1-ium-2-yl)prop-2-enylidene]-3,3-dimethyl-1-octadecylindole; perchlorate</small>	<ul style="list-style-type: none">- Normalization of ratio between hairs in anagen and telogen phase to the healthy 80:20 state- Increase of hair density by 9% in male and 16% in female subjects Subjective scoring of good sensory results for applied hair tonic formulation.

Ex vivo bioavailability study

Test design

Test system	<i>Ex vivo</i> skin
Test concentration	<ul style="list-style-type: none">▪ Biotinboosting feed delivery system loaded with hydrophilic and lipophilic fluorescent markers▪ Ethanol/water solution with hydrophilic and lipophilic fluorescent markers
Time of measurement	Measurements after 8 and 16 hours of penetration
Measurement	Penetration profile of hydrophilic fluorescent marker CF (6-Carboxyfluorescein) and lipophilic fluorescent marker DiL* into the skin and hair root area
Observed activity	The fluorescence was determined using confocal laser scanning microscopy on cross-sectional cuts of skin biopsies.

* IUPAC name: (2Z)-2-[(E)-3-(3,3-dimethyl-1-octadecylindol-1-ium-2-yl)prop-2-enylidene]-3,3-dimethyl-1-octadecylindole; perchlorate

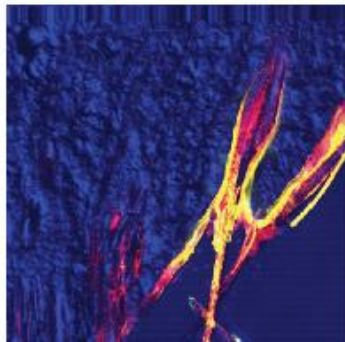


Ex vivo bioavailability study

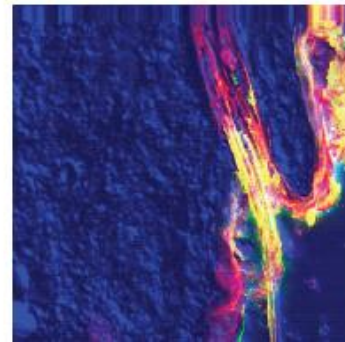
Improved availability of the ingredient

Penetration profile of hydrophilic (CF) and lipophilic (DiL) fluorescent markers into the skin and hair root area

CF + DiL in Bioboosting feed

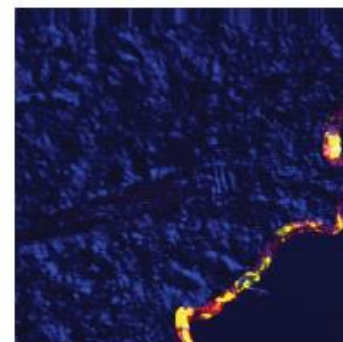


8 Hours

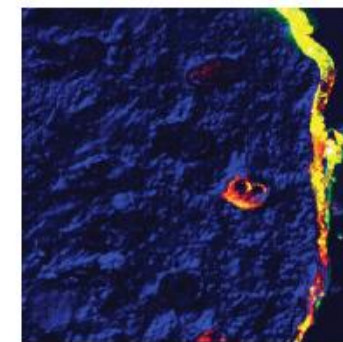


16 Hours

CF + DiL in Ethanol/water



8 Hours



16 Hours

The delivery system was able to deliver hydrophilic (yellowish signal) and lipophilic (reddish signal) ingredients into the skin and hair root area within 8 hours indicating that the delivery system is able to enhance the bioavailability of actives for hair care applications.

In vivo hair loss prevention study and self-assessment

Test design

Number of panelists 6 male and 6 female panelists with diffuse hair loss (aged 31-60)

Test formulation Hair tonic formulation containing 10%

Application Panelists apply the test formulation once daily over a period of 24 weeks (leave-on application). Measurements were taken after 6, 12, 18 and 24 weeks.

Application area Scalp

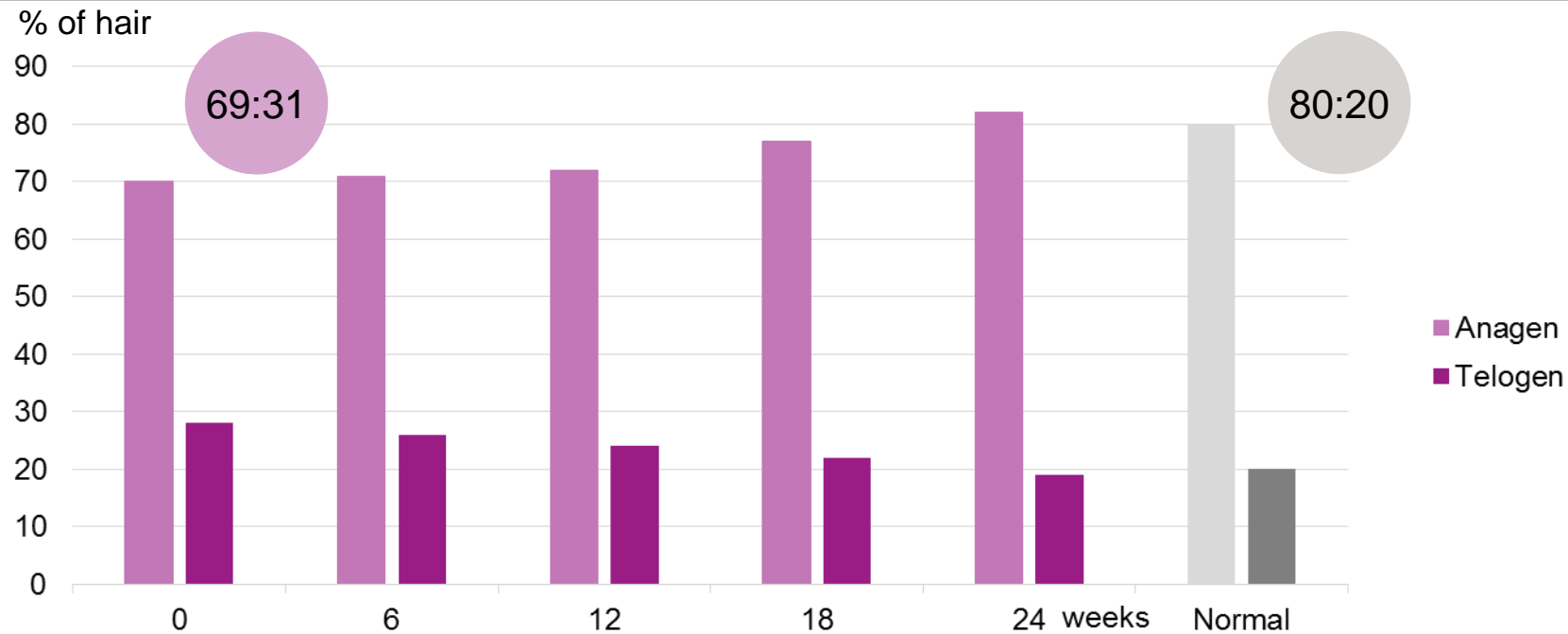
Measurement Ratio of anagen to telogen phase hair and hair density by means of TrichoScan® (TRICHOLOG GmbH, Freiburg, Germany). Self-assessment by panelists (rating between 1 (very good) and 6 (very poor) possible).



In vivo hair loss prevention study and self-assessment

Test results

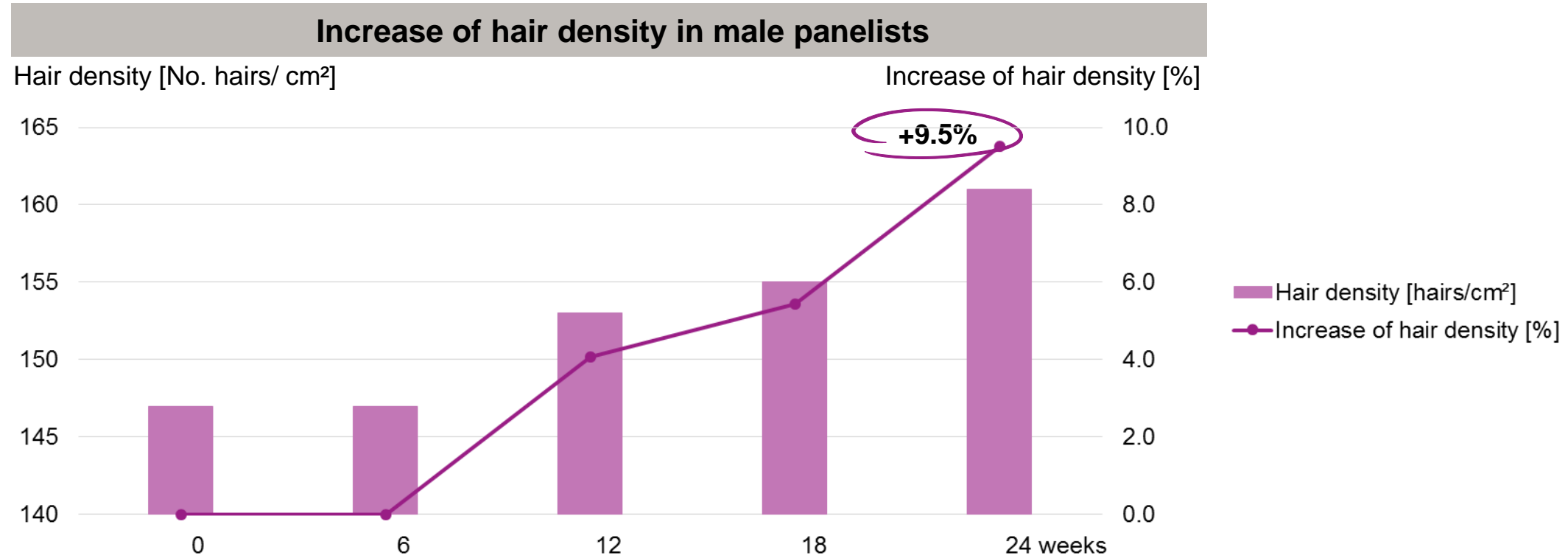
Change in percentage of hair in anagen and telogen phases in both male and female panelists



After 24 weeks of application, the test formulation containing 10% helps to normalize the ratio of hair in anagen / telogen phases towards the healthy 80:20 state.

In vivo hair loss prevention study and self-assessment

Test results



After 24 weeks of application of test formulation containing 10% the hair density of the male panelists has increased by 9.5% suggesting that the application may have contributed to provide conditions conducive to hair growth.

In vivo hair loss prevention study and self-assessment photo documentation – example panelists

Before
study



After 24
weeks
of use



6 weeks



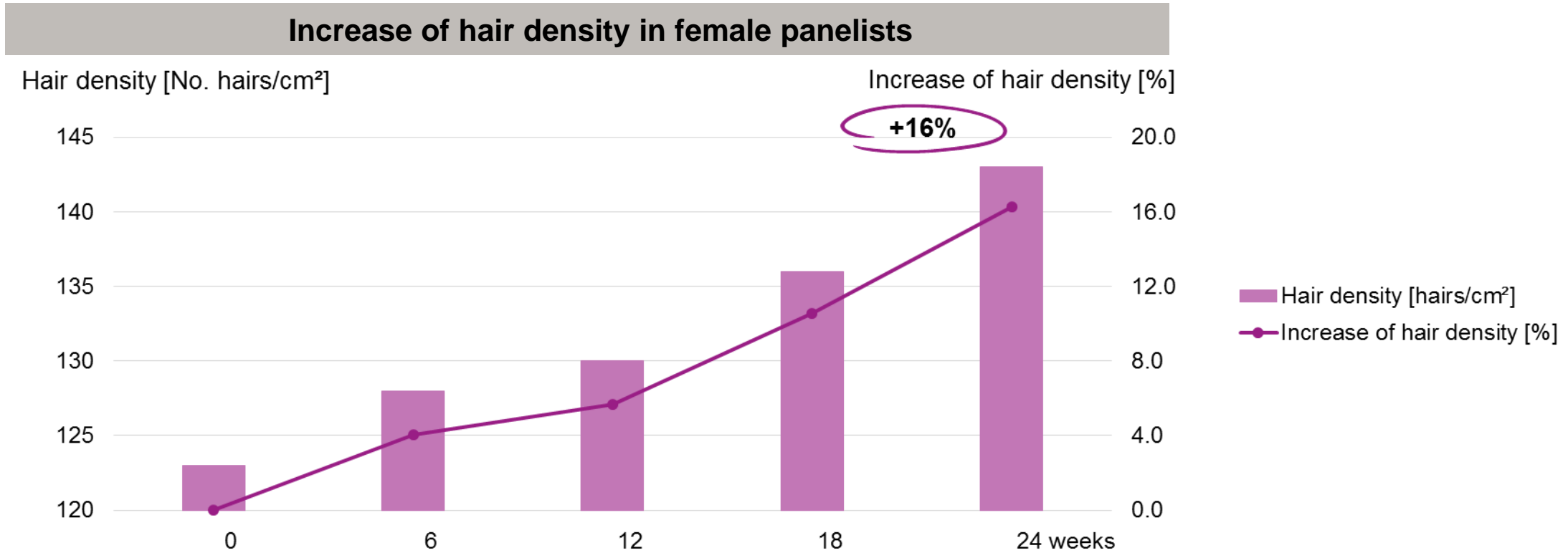
12 weeks



18 weeks

In vivo hair loss prevention study and self-assessment

Test results



After 24 weeks of application of test formulation containing 10% the hair density of the female panelists has increased by 16% suggesting that the application may have contributed to provide conditions conducive to hair growth.

In vivo hair loss prevention study and self-assessment photo documentation – example panelists

Before
study



After 24
weeks
of use



6 weeks



12 weeks

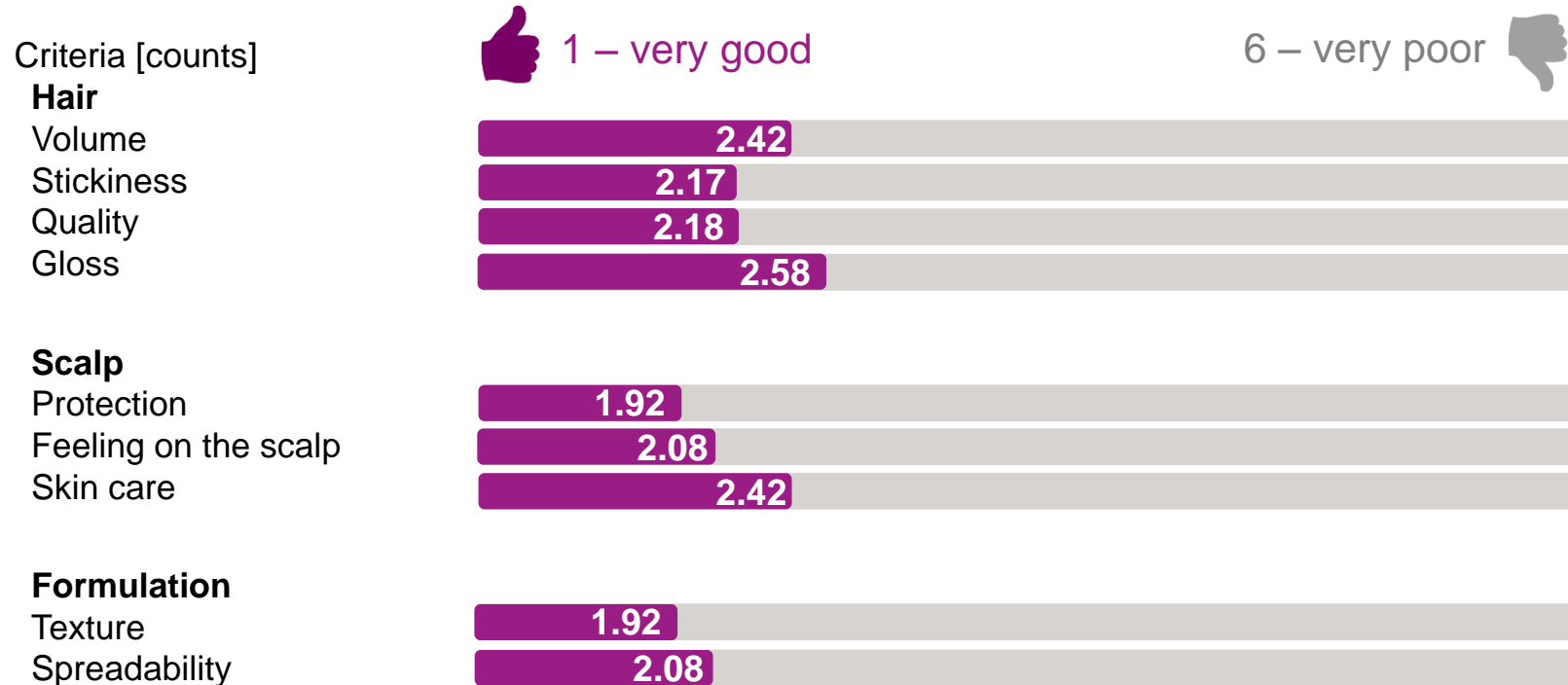


18 weeks

In vivo hair loss prevention study and self-assessment

Panel results

Self-assessment on product acceptance, efficacy and tolerance



The sensory profile of the hair tonic containing 10% provides good results regarding the evaluation of the formulation itself and the perceived properties during the application on scalp and hair.

Bioboosting Feed...

Bioavailability



... improves the delivery of hydrophilic and lipophilic active ingredients into the scalp and hair root area

Hair loss prevention



... contributes to improve hair density, normalizing the ratio of anagen and telogen hair growth phases and provides visible and perceptible results during application

Disclaimer

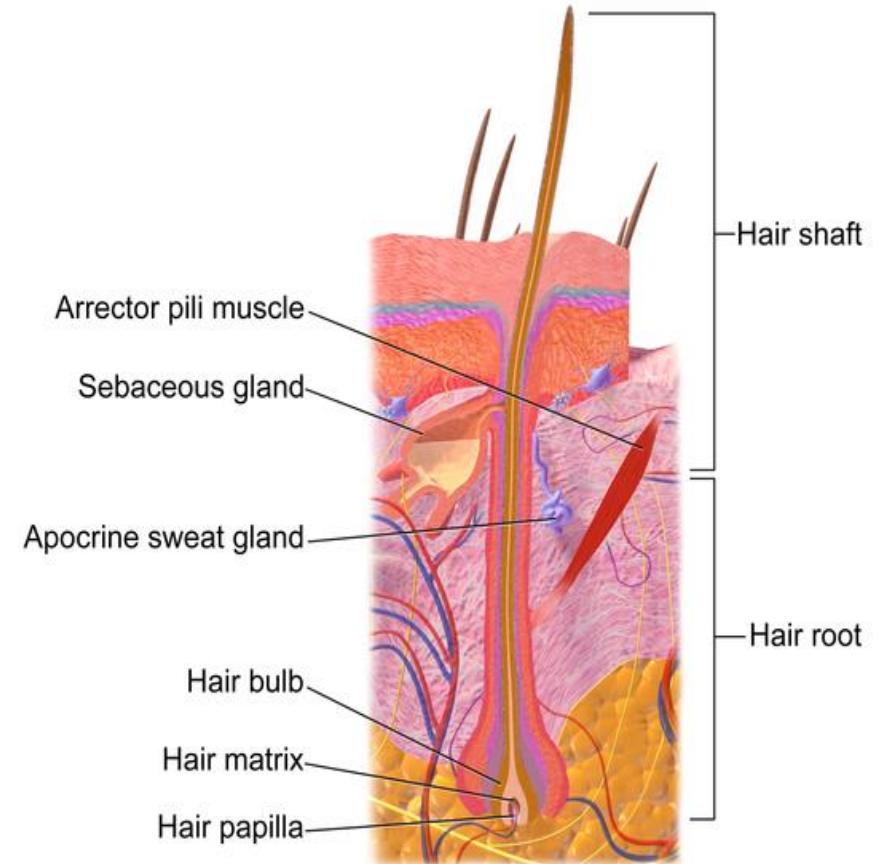
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Our studies Summary of Methods

Test	Methods
Bioavailability	Confocal laser scanning microscopy
Hair loss prevention	TrichoScan® (TRICHOLOG GmbH, Freiburg, Germany). Combines Epiluminescence Microscopy (ELM) with automatic digital image analysis Uses a computer visualization-based counting methodology to obtain a value for hair density (No. hairs/cm ²) and the anagen/telogen ratio.

Hair structure

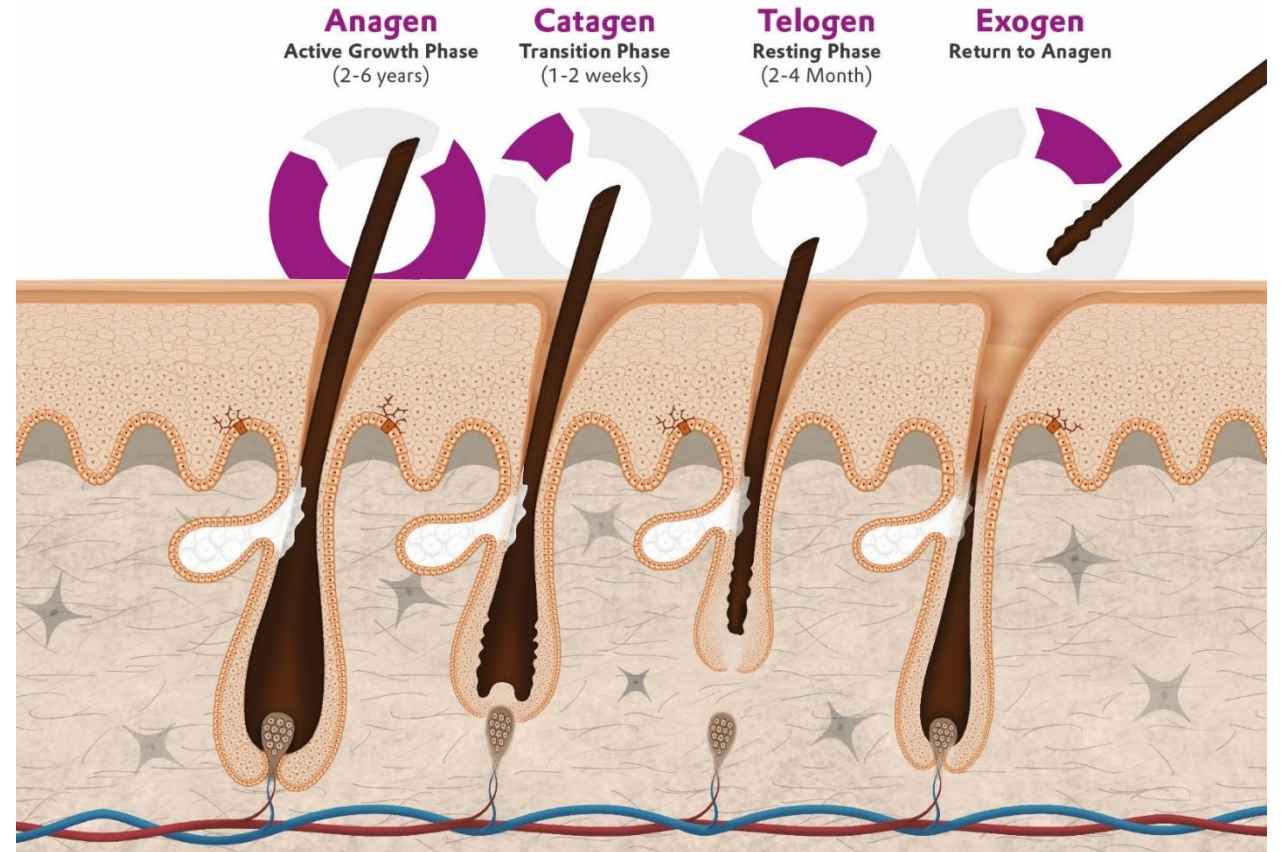
- A hair follicle is a mammalian skin organ that produces hair. Stem cells are responsible for hair production.
- The **hair papilla** is a large structure at the base of the hair follicle. The papilla is made up mainly of connective tissue and a capillary loop. Cell division in the papilla is either rare or non-existent.
- **Hair matrix** around the papilla is the hair matrix, a collection of epithelial cells often interspersed with the pigment-producing cells, the melanocytes. Cell division in the hair matrix produces the cells that form the major structures of the hair fiber and the inner root sheath.
- The **hair bulb/ bulge** is located in the outer root sheath at the insertion point of the arrector pili muscle. It houses several types of stem cells, which supply the entire hair follicle with new cells, and take part in healing the epidermis after a wound.



Hair Follicle Cycling

Hair grows in cycles of various phases :

- **Anagen phase:** active growth phase of hair follicles during which the hair root is dividing rapidly. Typical growth rate: about 1 cm every 28 days for 2– 7 years. Growth rate and remain in this stage are genetically determined. At the end of the anagen phase an unknown signal causes the follicle to go into the catagen phase.
- **Catagen phase (CP):** short transition stage occurring at the end of the anagen phase, signaling the end of the active growth of hair. CP lasts for about 2–3 weeks while the hair converts to a club hair. Club hair is formed during CP when the part of the hair follicle in contact with the lower portion of the hair becomes attached to the hair shaft. This process cuts the hair off from its blood supply and from cells producing new hair. When a club hair is completely formed, the hair follicle enters the telogen phase.
- **Telogen phase:** resting phase of hair follicle. When the body is subject to extreme stress, up to 70% of hair can prematurely enter the telogen phase and causing a noticeable loss of hair. This condition of stress is called *telogen effluvium*. The club hair is the final product of a hair follicle in the telogen stage, and is a dead, fully keratinized hair. 50- 100 club hair are shed daily from a normal scalp.
- Normally up to 90% of the hair follicles are in anagen phase while, 10–14% are in telogen and 1–2% in catagen. The cycle's length varies on different parts of the body.



Alopecia or Hair Loss

- **Androgenic alopecia** is hair loss that occurs due to an underlying susceptibility of hair follicles to androgenic miniaturization. It is the most common cause of hair loss and will affect up to 70% of men and 40% of women at some point in their lifetime. It more often causes diffuse thinning without hairline recession that rarely leads to total hair loss, although it is possible. Male and female follow different patterns.
- **Alopecia areata (AA)** is a condition in which hair is lost from some or all areas of the body, usually from the scalp. Because it causes bald spots on the scalp, especially in the first stages, it is sometimes called spot baldness. In 1–2% of cases, the condition can spread to the entire scalp (**alopecia totalis**, which involves the loss of all head hair) or to the entire epidermis (**alopecia universalis**, which involves the loss of all hair from the head and the body).

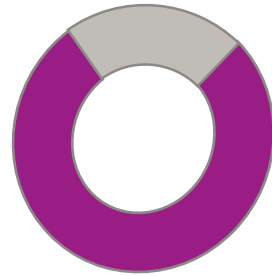


Hair growth cycle is changing during ageing and alopecia

Young and healthy hair means

- Properly regulated hair cycle
- Healthy hair follicle

Hair life cycle



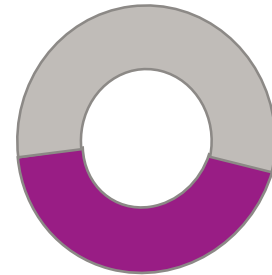
> 80% hair actively growing
(anagen phase)



- Voluminous,
shiny & powerful
hair

Ageing hair and alopecia means

- Unbalanced levels of androgens
(e.g. dihydrotestosterone)
- Miniaturization of the hair follicle



Anagen phase is shortened



- Hair loss
- Formation of fine
& lifeless hair

An increase in anagen hair rate indicates a hair follicle stimulating effect.