

**CLINICAL EFFICACY STUDY OF THE
BIO-PILIXIN® FORMULA USED IN A
HAIR SERUM**

SCANDINAVIAN BIOLABS

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Efficacy study no.: ID034-21

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ABSTRACT:

A single centre study was conducted with 30 volunteers with alopecia. All volunteers were informed of the study protocol and purpose and signed an informed consent form. The study was conducted according to the standard operating procedure of Centro de Tecnología Capilar, S.L. and in compliance with the regulations established in "Guía para investigaciones con seres humanos" (Guidelines for Research on Human Beings) and the guidelines of the Scientific Committee on Consumer Safety (SCCS)

General inclusion criteria were applied which were age between 18 to 65 years, healthy Caucasian women and men with hair loss. They were required to keep their normal diet throughout the study.

General exclusion criteria were applied, such as e.g. known allergy or hypersensitivity to the used products, scalp diseases such as e.g. psoriasis, dermatitis etc, pregnancy or planning to become pregnant, use of medication known to cause hair loss, use of products against hair loss.

The study duration was 150 days. Volunteers came to the study site at the beginning of the study after 45 days of started the treatment and at the end of the study. They did not wash or comb their hair before each visit for 48 hours and for 24 hours, respectively. At each visit, a general pictures, hair density analysis by Trichoscan® (Tricholog GmbH, Freiburg, Germany), wash and combing test in order to see the number of magnitude of hair loss and finally, the anagen to catagen/telogen ratio and the % anagen and % of telogen was analysis by using a Trichogram at the beginning and at the end of the study

The most important results can be summarized as:

- 5709 new hairs after 150 days of treatment
- 90.0% of volunteers show an increasing in anagen phases and 86.6% of volunteers show a reduction in telogen phases after 150 days of treatment
- 90.0% of volunteers show an increasing in anagen/telogen ratio after 150 days of treatment.
- 10200 hairs saved after 45 days of treatment (considering the hair loss at the beginning of the experiment constant in the 150 days of the experiment)
- 29550 hairs saved after 150 days of treatment (considering the hair loss at the beginning of the experiment constant in the 150 days of the experiment)

I. EVALUATION STUDY

1. TITLE

Study on the anti-hair loss and hair regeneration effect of a hair serum.

2. OBJECTIVE

2.1. PRIMARY OBJECTIVE

The main objective aim of this experiment is to investigate whether the application of product tested produces a reduction in hair loss as well as hair regeneration for 5 months of treatment.

To evaluate the number of hairs in anagen phase for the individuals who participated in the study.

To evaluate the number of hairs in telogen phase for the individuals who participated in the study.

To evaluate the effect of the product under study at different times through the self-perception of characteristics such as increased hair strength increased vitality, reduced hair loss, increased number of new hairs, as well as issues related to the tolerance of the product.

3. EXPERIMENTAL DESIGN

3.1. TYPE OF STUDY

Single-center study, with 30 volunteers with alopecia. The study was conducted according to the standard operating procedure of Centro de Tecnología Capilar, S.L. and in compliance with the regulations established in "Guía para investigaciones con seres humanos" (Guidelines for Research on Human Beings) and the guidelines of the Scientific Committee on Consumer Safety (SCCS).

4. STUDY DURATION

150 days (5 months of treatment).

The next tests were carried out at the following times:

- ✓ T₀
 - General photograph of the hair
 - Trichoscan®
 - Cosmetic Trichogram
 - Combing test
 - Wash test

- Volunteer questionnaire

- ✓ T₄₅
 - Combing test
 - Wash test
 - Volunteer questionnaire

- ✓ T₁₅₀
 - General photograph of the hair
 - Trichoscan®
 - Cosmetic Trichogram
 - Combing test
 - Wash test
 - Volunteer questionnaire

5. ATTRIBUTES UNDER STUDY

The following attributes were evaluated in this study:

- ✓ General appearance of the hair
- ✓ Anagen / Telogen ratio (Cosmetic Trichogram)
- ✓ Number of hairs extracted during the combing test
- ✓ Number of hairs extracted during the wash test
- ✓ Volunteer questionnaire

6. EQUIPMENTS AND MATERIAL

The following items were required to conduct this study:

- ✓ Canon EOS 600D digital camera
- ✓ TrichoScan, Tricholog GmbH, Germany
- ✓ Dino-Lite Pro Digital Microscope (microcámara), Naarden, Holland
- ✓ Light microscope
- ✓ Pean clamp
- ✓ Disposable plastic capes
- ✓ Means of inclusion for microscopy.

7. PERSONNEL

7.1. TECHNICIANS

Two specialized technicians in capillary treatments carry out the combing and wash test. A specialist in trichology does the general photographs, microphotography of the scalp, cosmetic trichogram and phototrichogram.

7.2. VOLUNTEERS

Number of volunteers: 30

Sex: 87% Women and 13% Men

Age: 18-65 years (47 ± 11)

Table 1. Description of the voluntaries according to sex and age

Volunteer	1	2	3	4	5	6	7	8	9
Sex	W	W	W	W	W	W	W	W	W
Age	43	59	55	56	38	35	31	37	46
Type of hair loss	Stress	Seasonal	Hormonal	Seasonal	Hormonal	Stress	Seasonal	Seasonal	Hormonal
Volunteer	10	11	12	13	14	15	16	17	18
Sex	W	W	W	W	W	W	W	W	W
Age	60	50	57	56	52	49	45	52	61
Type of hair loss	Hormonal	Stress	Hormonal	Hormonal	Stress	Seasonal	Hormonal	Hormonal	Hormonal
Volunteer	19	20	21	22	23	24	25	26	27
Sex	W	W	W	W	W	W	W	W	M
Age	40	52	19	49	53	47	25	62	57
Type of hair loss	Stress	Seasonal	Seasonal	Stress	Seasonal	Hormonal	Seasonal	Hormonal	Hormonal
Volunteer	28	29	30						
Sex	M	M	M						
Age	46	39	53						
Type of hair loss	Seasonal	Hormonal	Hormonal						

7.3. SELECTION CRITERIA

7.3.1. Inclusion criteria

- Age 18-65 years
- General hair loss
- Both gender
- Healthy volunteers
- No evidence of systemic diseases (e.g. cardiac, psychiatric disease)
- Commitment to not use topical or oral systemic products with a similar effect to that of the products to be tested throughout the study period
- Commitment to not change their daily routine
- Having signed the written consent form and being informed of the study objective
- Enough motivation and availability.

7.3.2. *Non-inclusion / exclusion criteria*

- Not to sign the written consent
- Known allergy or hypersensitivity to any component of the product under study
- Scalp diseases: psoriasis, dermatitis. etc.
- Treatment with medication that may cause alopecia: fluoxetine, anticoagulants, retinoids, etc.
- Use of nutricosmetics for reducing hair loss
- Modification of normal diet
- Pregnant voluntary.

7.4. CONSENT

Each volunteer was informed orally and in writing about the characteristics and objectives of the study. Each volunteer signed a written consent form and received a copy, with another copy kept on file at C.T.C.

7.5. INCIDENTS AND WITHDRAWALS

None

8. FORMULAS

8.1. PRODUCT UNDER STUDY

Product: Bio-Pilixin ® Hair Growth Serum

INCI: Aqua, Alcohol, Niacinamide, Caffeine, Curcuma Longa Callus Conditioned Media, Panthenol, Vanillyl Butyl Ether, Sodium PCA, Sodium Lactate, Arginine,

Aspartic Acid, PCA, Pentylene Glycol, Zinc PCA, Glycine, Alanine, Serine, Valine, Isoleucine, Proline, Threonine, Histidine, Phenylalanine, Phytic Acid, Perfum.

✓ Manufactured by: Scandinavian Biolabs

Moreover, the treatment is completed with a neutral shampoo for alternate days to homogenize treatments and not create subsequent interpretation biases.

9. PROTOCOL

9.1. BEFORE THE START OF THE STUDY (T₋₂)

The volunteers did not wash their hair 48 hours prior to the first visit to C.T.C. and they did not comb their hair 24 hours prior to this visit (T₀).

9.2. T₀

During the first visit to C.T.C., one specialist carried out the following tests:

- General photograph of the hair
- Trichoscan®
- Cosmetic Trichogram
- Combing test
- Wash test
- Volunteer questionnaire.

9.3. IN THE VOLUNTEERS' HOMES

The volunteers applied the product according of customer's requirements.

Apply the product daily (about 4 mL): Minimum of two pipettes, enough to cover entire scalp once a day, at night time on clean scalp. Massage gently with fingertips to aid adsorption. The lotion has to be applied on hair roots. Do not rinse.

9.4. T₄₅

The volunteers did not wash their hair 48 hours prior to the visit to C.T.C. and they did not comb their hair 24 hours prior to this visit (T₄₅). During the visit to C.T.C., one specialist carried out the following tests:

- Combing test
- Washing test

- Volunteer questionnaire.

9.5. T₁₅₀

The volunteers did not wash their hair 48 hours prior to the visit to C.T.C. and they did not comb their hair 24 hours prior to this visit (T₁₅₀). During the visit to C.T.C. one specialist carried out the following:

- General photograph of the hair
- Trichoscan®
- Cosmetic Trichogram
- Combing test
- Wash test
- Volunteer questionnaire.

10. TESTS CARRIED OUT

10.1. GENERAL PHOTOGRAPHS OF THE HAIR

Several photographs were taken of the upper part of the scalp. The images show the temporal and vertex areas (crown) of all volunteers.

The objective was to see whether the treatment under study visually improves the quality and appearance of the hair.

10.2. COSMETIC TRICHOGRAM

It consists on the extraction by traction of a determined number of hairs from the scalp, in order to know in which phase of the hair growth cycle they are in, Anagen growth phase or Catagen / Telogen fall phase, as well as the initial and final appearance of the hair bulbs.

In general, the cosmetic trichogram is very useful to study the physiology and pathology of hair growth, to evaluate the evolution of the trichological processes, to establish its prognosis and to determine the most appropriate therapeutics for the different types of alopecia.

The cosmetic trichogram is a “snapshot” of the condition of the hair roots or bulbs, and therefore, of the scalp at a certain time. Depending on the results, it allows us to know if the hair is renewed normally or if there is any alteration of the capillary cycles.

In this study, we try to find out if the treatment is capable of improving the growth or anagen phases with respect to the fall or telogen phases, and if it produces an improvement in the physiology of the bulbs and capillary sheaths.

10.2.1. Protocol

This was carried out at the start (T_0) and at the end of the study (T_{150}).

As a precondition, the volunteers did not wash nor treat their hair with any cosmetic product at least 48 hours before the cosmetic trichogram was carried out, in order to maintain the hairs which are near the end of telogen phase and avoid the artificial reduction in the percentage of telogenic hairs observed in the trichogram. The left parieto-occipital area was selected for extracting hairs.

Plucking was repeated as many times as necessary to obtain the number of hairs needed for the cosmetic trichogram. Immediately after epilation, the hair bulbs were mounted on glass slides for microscopic study.

10.2.2. Expression of results

The following were calculated:

- A_0 Number of hairs in anagen phase at T_0 (before the treatment).
- T_0 Number of hairs in telogen phase at T_0 (before the treatment).
- $\%A_0$ Percentage of hairs in anagen phase at T_0 (before the treatment).
- $\%T_0$ Percentage of hairs in telogen phase at T_0 (before the treatment).

- A_{150} Number of hairs in anagen phase at T_{150} (after 150 days of treatment).
- T_{150} Number of hairs in telogen phase at T_{150} (after 150 days of treatment).
- $\%A_{150}$ Percentage of hairs in anagen phase at T_{150} (after 150 days of treatment).
- $\%T_{150}$ Percentage of hairs in telogen phase at T_{150} (after 150 days of treatment).

10.2.3. Criteria for evaluating results

In order to evaluate the results obtained in the study, the trichogram values considered "normal" in the literature consulted were used as a reference.

According to Camacho and Montagna, normal trichogram values for a healthy adult are as follows:

Phase of the hair cycle	% of hairs
Anagen	86
Catagen	1
Telogen	13

However, it is very possible that these values should be revised. Indeed, as confirmed in recent dermatology conferences and through our experience, nowadays it is not frequent to find such a high proportion of hairs in anagen phase. Currently, the most common trichograms show a definite increase of hairs in telogen phase and a slight increase of hairs in catagen phase.

This observation is already being applied in efficacy studies of cosmetic products for hair loss.

10.3. HAIR DENSITY

This is defined as the number of hairs present in a unit of area (generally cm²). Increased hair density at the end of the study is invaluable proof of the efficacy of the regeneration treatment.

10.3.1. Protocol

The number of hairs present by unit of area was calculated from images of the scalp taken with the TrichoScan[®] microcamera.

The computer program associated with TrichoScan[®] was used for this, permitting manual counting of the number of hairs present in an area equaling 0.592cm² of scalp. For comparison between the number of hairs present at the end and at the start of the study, the increase in the number of hairs in that area was established and hair density could be calculated at the end of the study.

10.4. BULB PHOTOGRAPHS

The photographs of the roots at the beginning and at the end of the study of the three most representative results for each group allow us to:

- Confirm the results of the cosmetic trichogram
- View the hair bulbs at the start and at the end of treatment and thus ascertain its efficacy in the appearance and development of the bulbs.

10.5. COMBING TEST

The number of hairs falling out during hair combing under standardized conditions was determined.

After the regeneration treatment under study, the goal was for the number of hairs falling out during combing to be lower than the initial value.

10.5.1. Protocol

As a precondition, the volunteers came to the visit without having washed their hair at least 48 hours before and without having combed their hair at least 24 hours before, in order to maintain the hairs which are near the end of telogen phase and avoid artificial reduction in the percentage of hairs in telogen phase.

The technician combed each volunteer's hair according with a standard protocol. The hair falling out – in the comb and on the cape – was collected for later counting.

10.6. WASH TEST

The number of hairs falling out during hair washing under standardized conditions was determined.

After the regeneration treatment under study, the goal was for the number of hairs falling out during washing to be lower than the initial value.

10.6.1. Protocol

As a precondition, the volunteers came to the visit without having washed their hair at least 48 hours before and without having combed their hair at least 24 hours before, in order to maintain the hairs which are near the end of telogen phase and avoid artificial reduction in the percentage of hairs in telogen phase.

The technician washes each volunteer's hair according with a standard protocol. The hair falling out was collected for later counting.

10.7. VOLUNTEERS' SURVEYS

Volunteers evaluated the general aspect of their hair at different control points.

10.8. STATISTICAL ANALYSIS

Statistical descriptive analysis was performed for each biometric quantitative variable along experimental times, including basic descriptive parameters (central tendency and variance) that define the distribution for each response variable in treatment and control along experimental times. In addition, graphical figures are added in order to show the average tendency on the response variables in both treatment and control along experimental times.

Linear mixed-effects models is adjusted to data distributions to each response variable, in order to assess the treatment efficacy of the tested products versus control along experimental times. The treatment effect of principal variables was interpreted by comparing treatment to control in baseline and each experimental time. Every model used in this study for data analysis is contained in the lme function of nlme package for R software.

Multiple biometric correlated measurements along time (volunteers assessed in different timepoints) are considered by including random effects for each individual, allowing the intercept to vary at random between volunteers. In addition, the experimental times relative to baseline are compared marginally for treatment and control.

In order to evaluate the efficacy between treatments at each timepoint, normally distributed data that could not be fitted by a linear mixed-effects model were analysed using a paired Student's t-test. The effect of treatments on biometric measures was interpreted by comparing treatments with each other at each timepoint.

In order to compare timepoints with baseline for each treatment, normally distributed data that could not be fitted by a linear mixed-effects model were analysed using a paired Student's t-test. The effect of time on biometric measures was interpreted by comparing timepoints with baseline for each treatment.

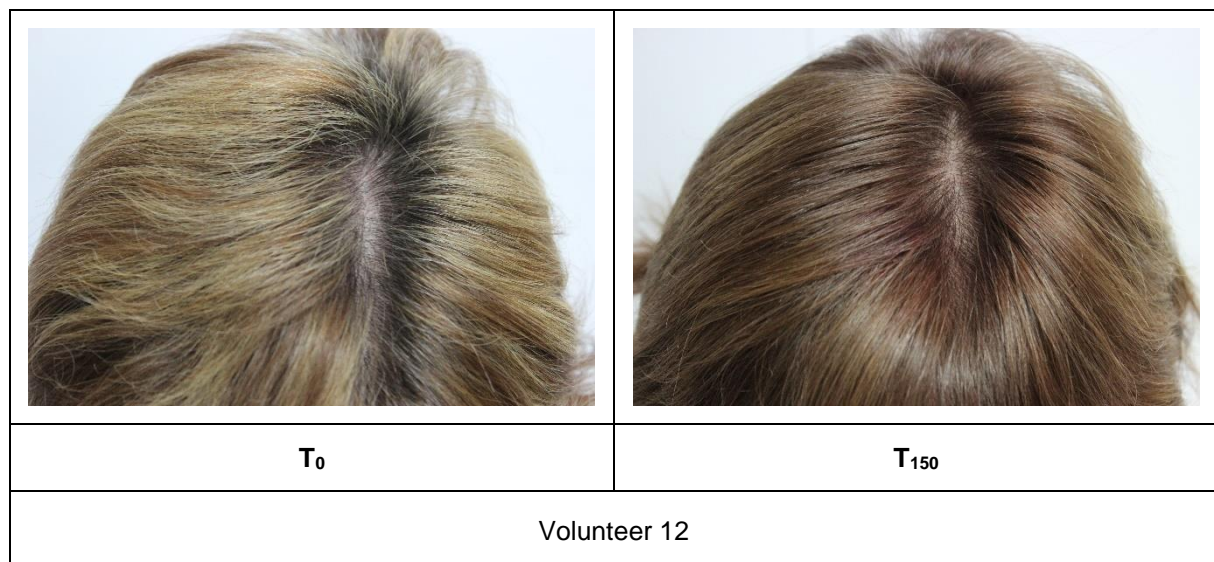
In case of non-normality of data distribution, a Wilcoxon Signed-Rank test is performed to make comparisons between treatment and control in baseline and each experimental time. In addition, the experimental times relative to baseline are compared marginally for treatment and control.

If the null hypothesis of no differences among treatment and control in each timepoint is rejected, it can be concluded that there are significant differences among treatment and control in that experimental time.

If the null hypothesis of no differences among each experimental time and baseline is rejected, it can be concluded that there are significant differences among the timepoint under assessment and baseline.

II RESULTS**1. GENERAL PHOTOGRAPHS**

In the present report, the three most representative photographs for each group are indexed by way of illustration.






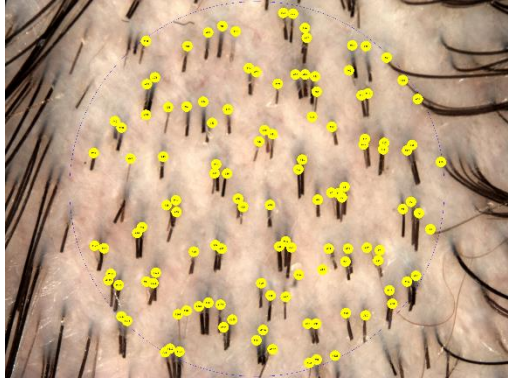
T₀

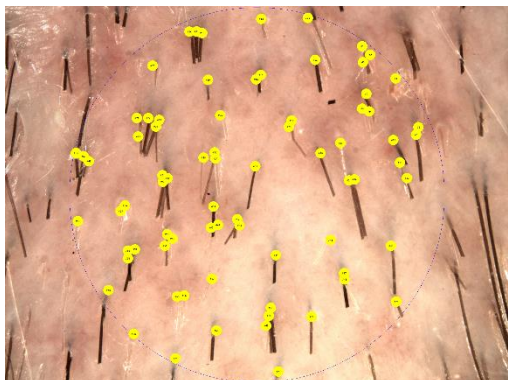
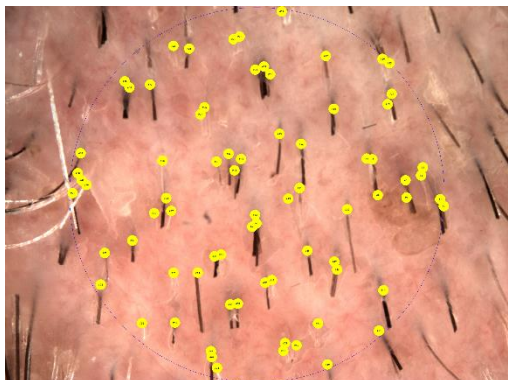


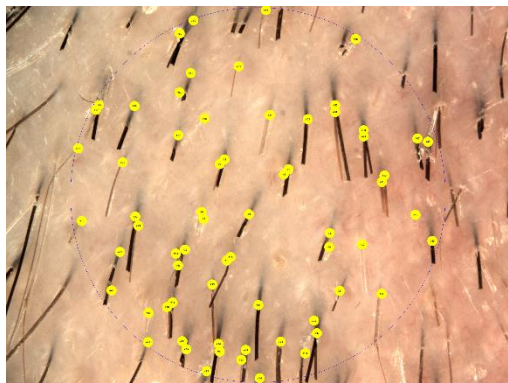
T₁₅₀

Volunteer 19

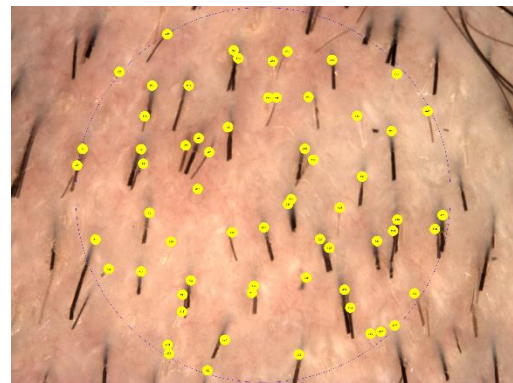
2. HAIR DENSITY

	
T₀	T₁₅₀
Volunteer 1	

	
T₀	T₁₅₀
Volunteer 2	

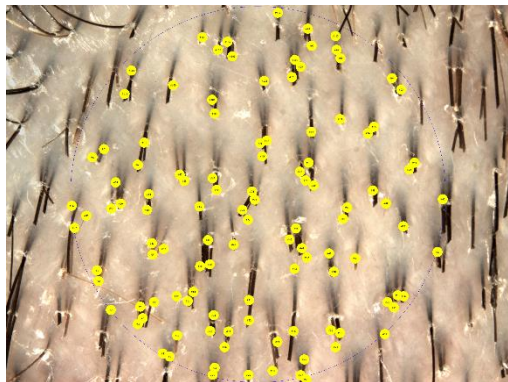


T₀

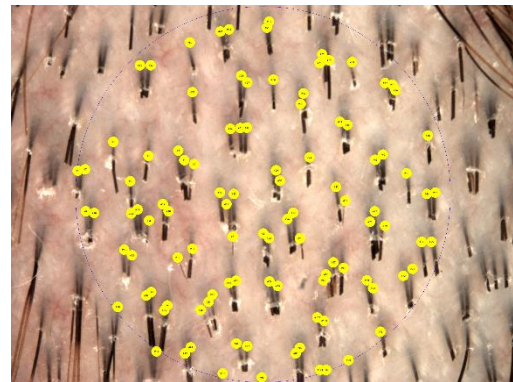


T₁₅₀

Volunteer 3

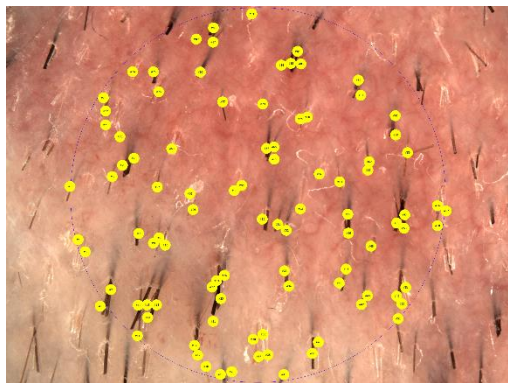


T₀



T₁₅₀

Volunteer 4

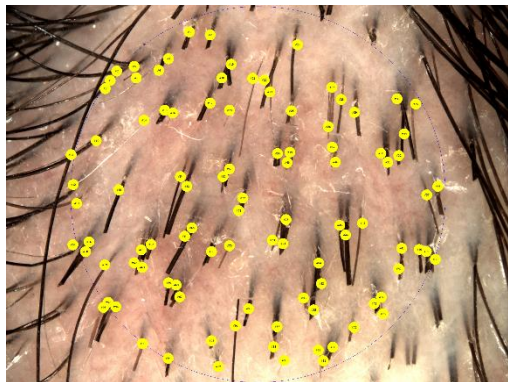


T₀

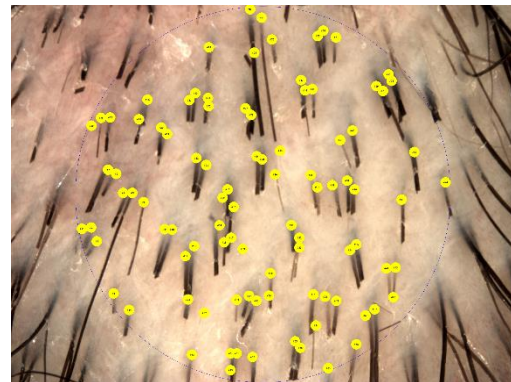


T₁₅₀

Volunteer 5

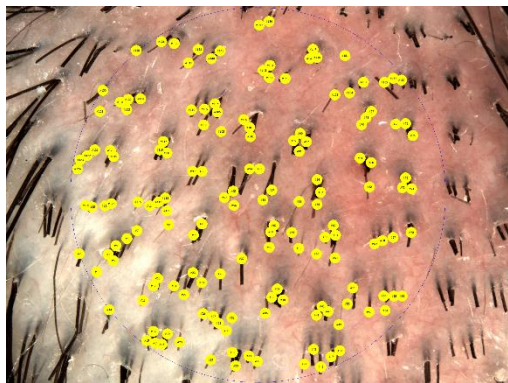


T₀



T₁₅₀

Volunteer 6

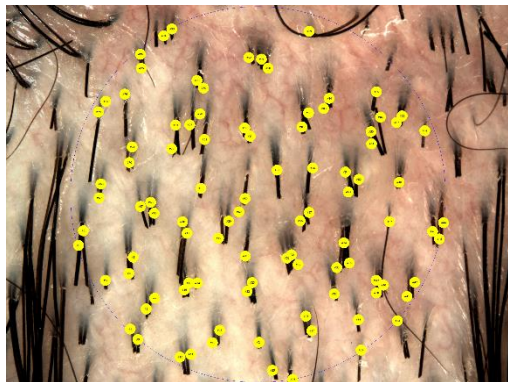


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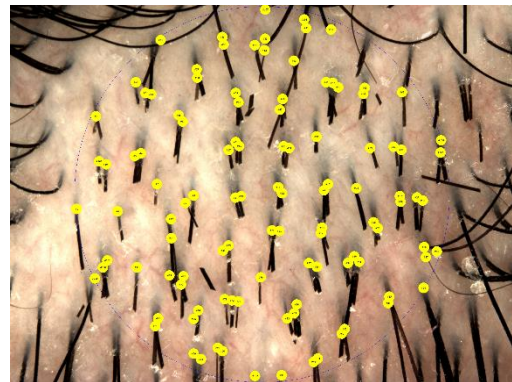


T₁₅₀

Volunteer 7



T₀



T₁₅₀

Volunteer 8

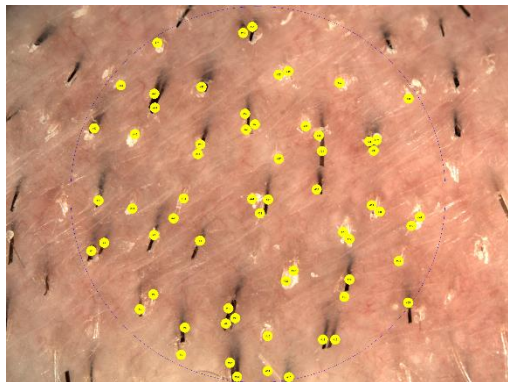


T₀



T₁₅₀

Volunteer 9

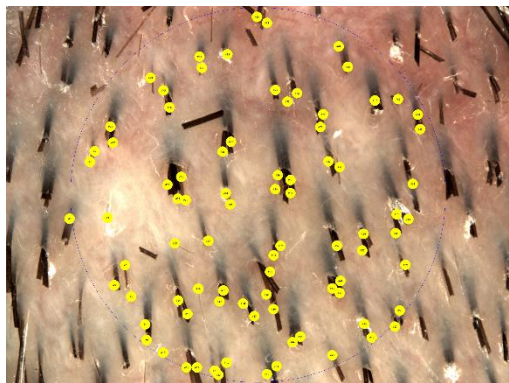


T₀

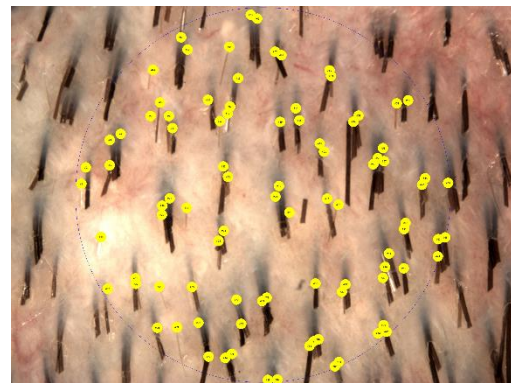


T₁₅₀

Volunteer 10



T₀

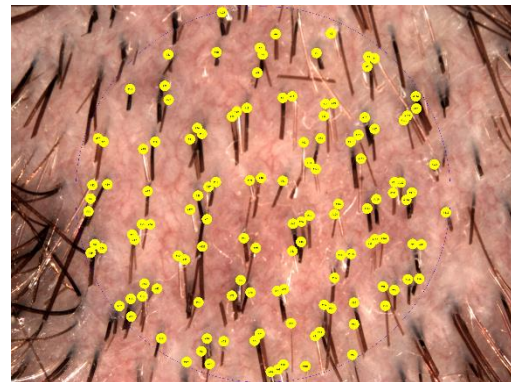


T₁₅₀

Volunteer 11

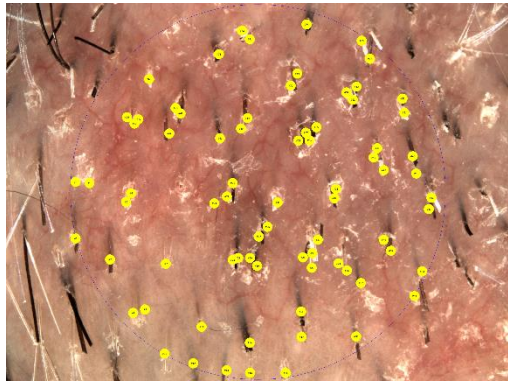


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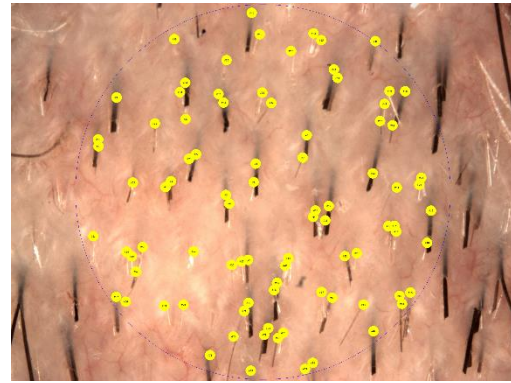


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Volunteer 12

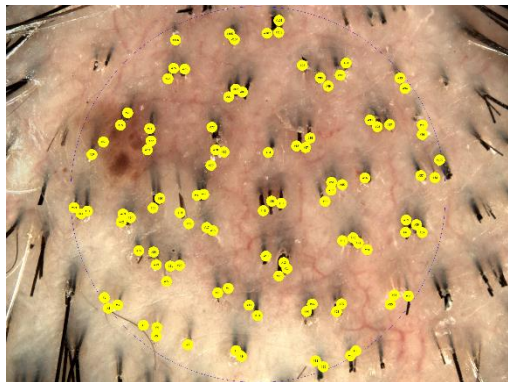


T₀



T₁₅₀

Volunteer 13

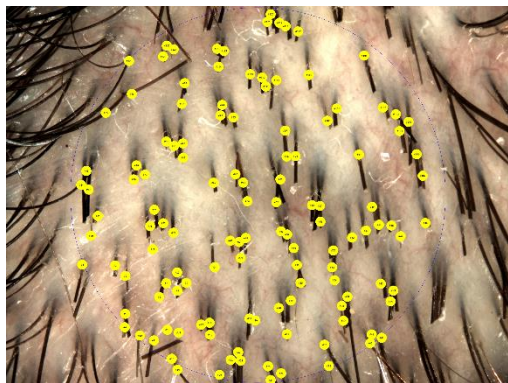


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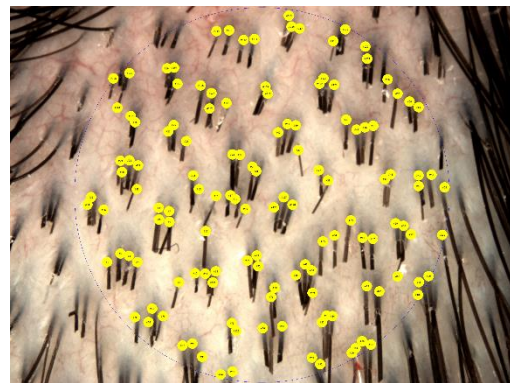


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Volunteer 14

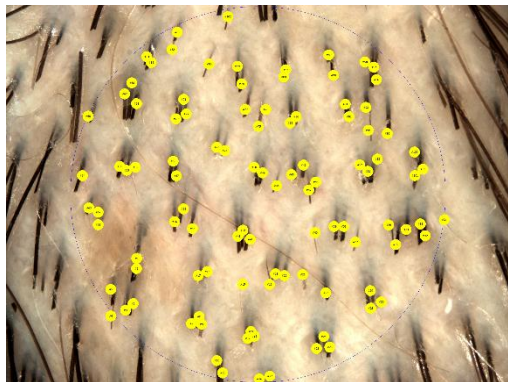


T₀

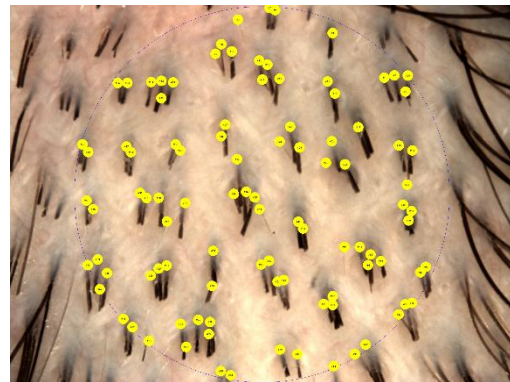


T₁₅₀

Volunteer 15

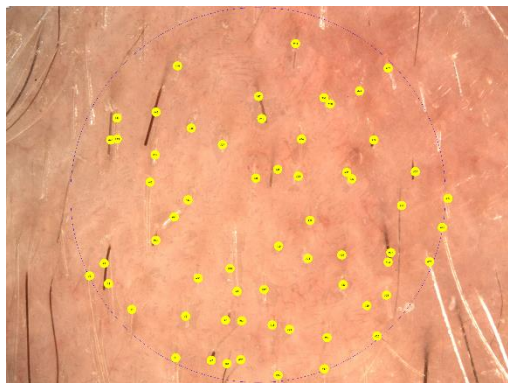


T₀

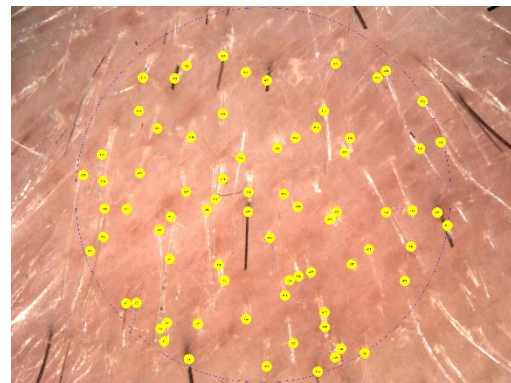


T₁₅₀

Volunteer 16

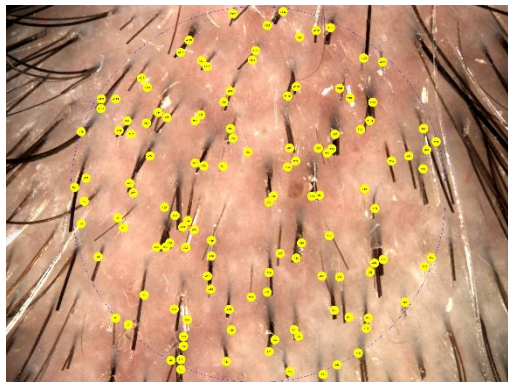


T₀

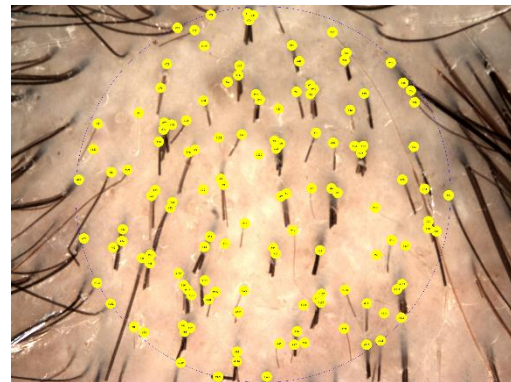


T₁₅₀

Volunteer 17

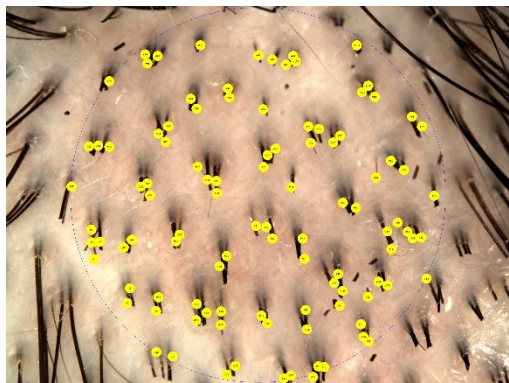


T₀

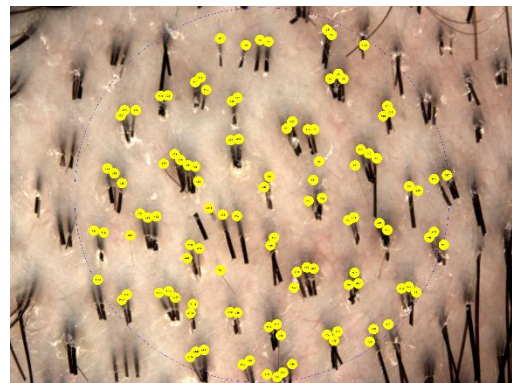


T₁₅₀

Volunteer 18

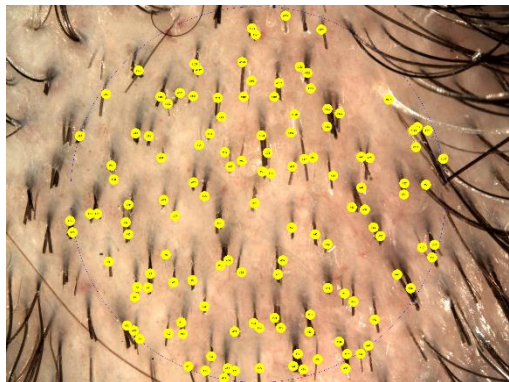


T₀

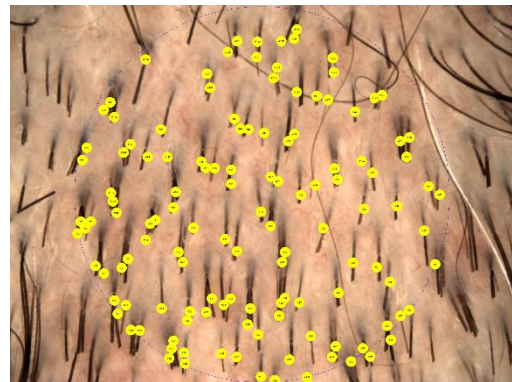


T₁₅₀

Volunteer 19

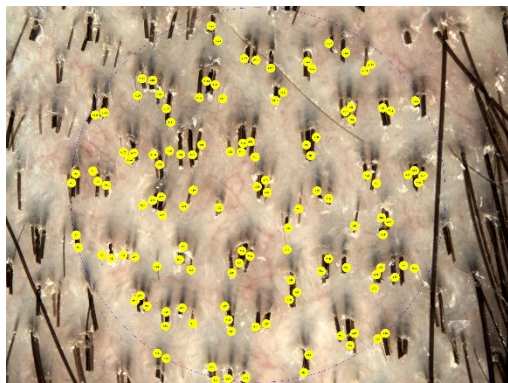


T₀

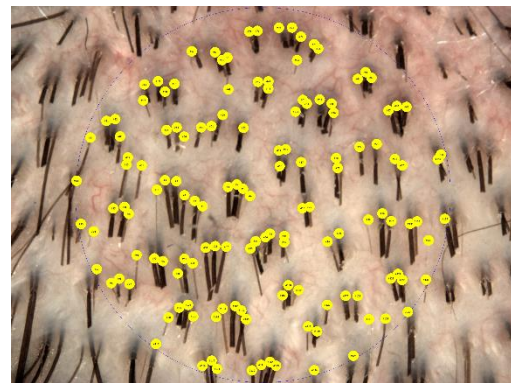


T₁₅₀

Volunteer 20

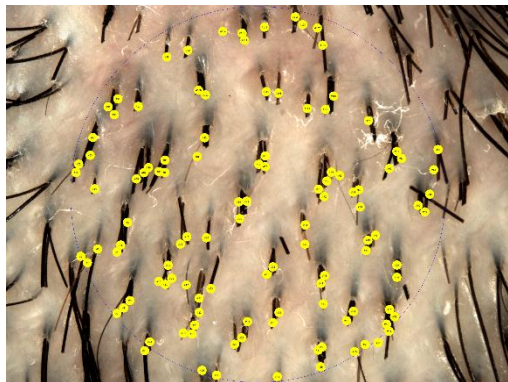


T₀



T₁₅₀

Volunteer 21

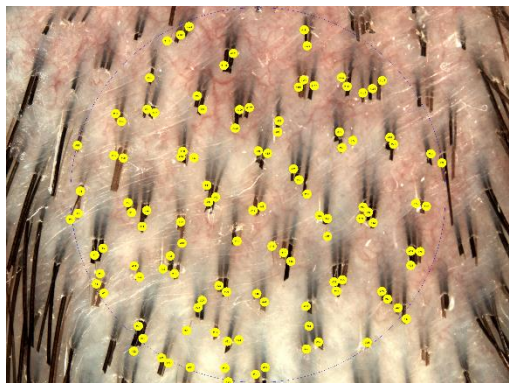


T₀

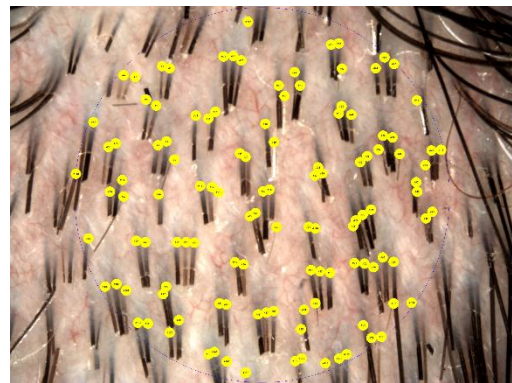


T₁₅₀

Volunteer 22

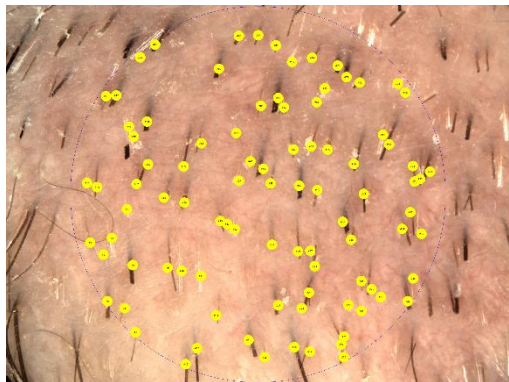


T₀

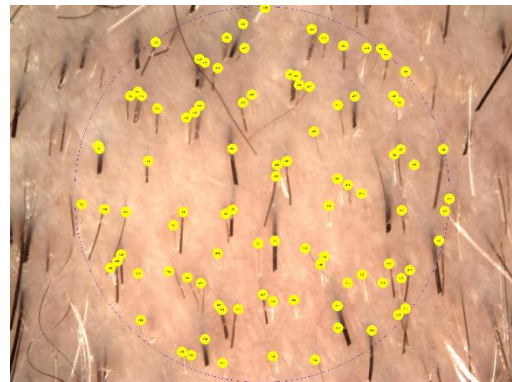


T₁₅₀

Volunteer 23

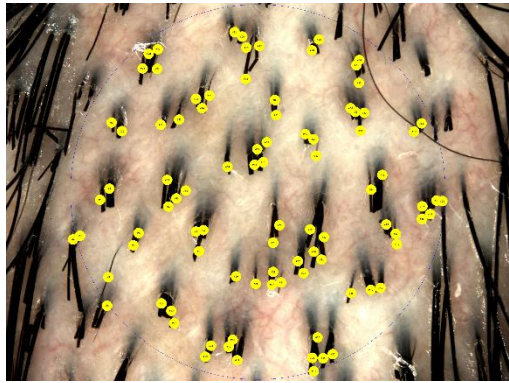


T₀

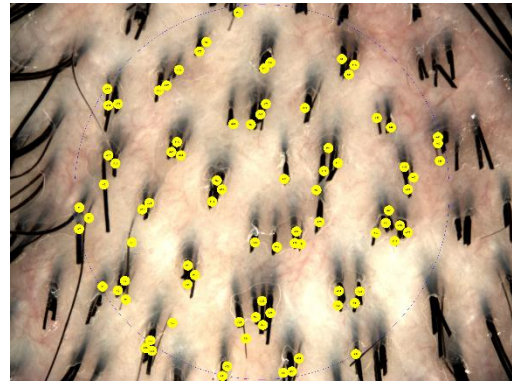


T₁₅₀

Volunteer 24



T₀



T₁₅₀

Volunteer 25

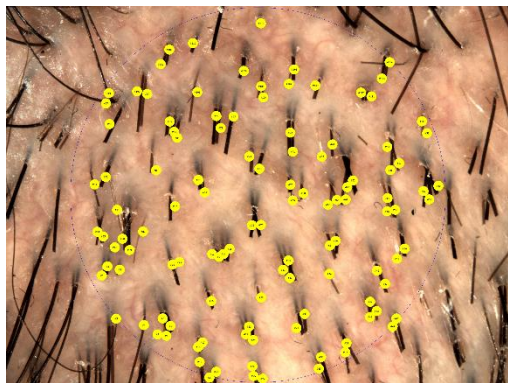


T₀

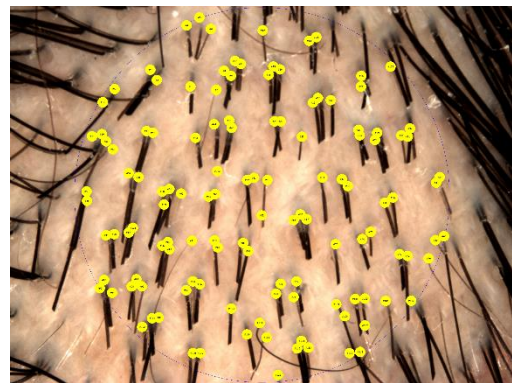


T₁₅₀

Volunteer 26

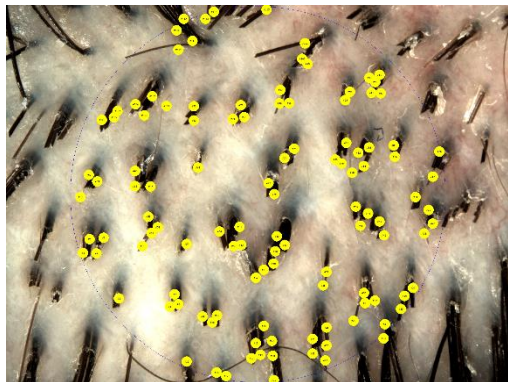


T₀

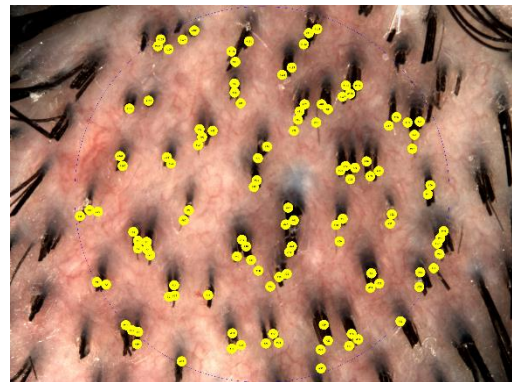


T₁₅₀

Volunteer 27

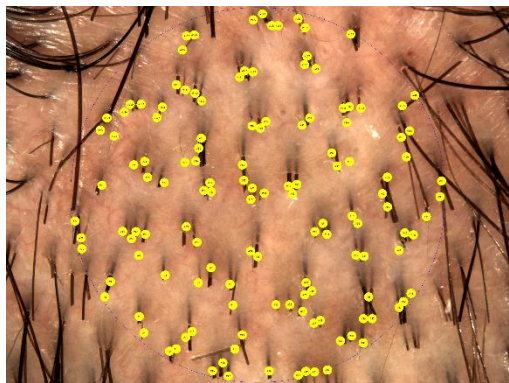


T₀

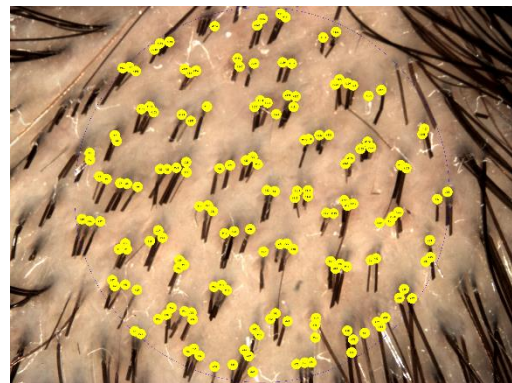


T₁₅₀

Volunteer 28

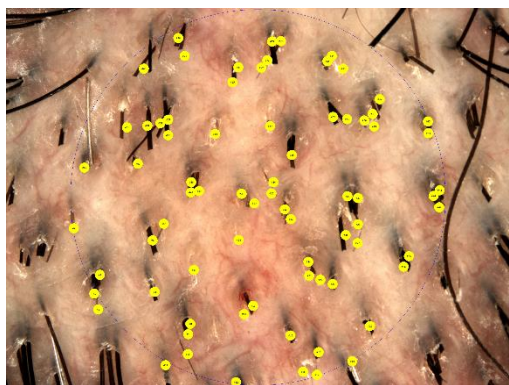


T₀

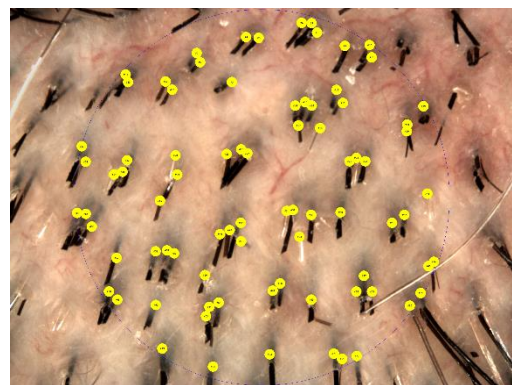


T₁₅₀

Volunteer 29



T₀



T₁₅₀

Volunteer 30

2.1. HAIR DENSITY VALUES

Volunteers	Nº HAIR / 0,592cm ²		HAIR DENSITY 1/cm ²		INCREASE IN HAIR DENSITY T ₀ VS T ₁₅₀
	T ₀	T ₁₅₀	T ₀	T ₁₅₀	
1	115	122	194.26	206.08	6.09%
2	76	75	128.38	126.69	-1.32%
3	66	63	111.49	106.42	-4.55%
4	113	104	190.88	175.68	-7.96%
5	95	99	160.47	167.23	4.21%
6	98	95	165.54	160.47	-3.06%
7	155	174	261.82	293.92	12.26%
8	96	109	162.16	184.12	13.54%
9	103	113	173.99	190.88	9.71%
10	63	60	106.42	101.35	-4.76%
11	84	91	141.89	153.72	8.33%
12	116	129	195.95	217.91	11.21%
13	76	87	128.38	146.96	14.47%
14	106	112	179.05	189.19	5.66%
15	125	132	211.15	222.97	5.60%
16	102	99	172.30	167.23	-2.94%
17	61	75	103.04	126.69	22.95%
18	125	131	211.15	221.28	4.80%
19	104	112	175.68	189.19	7.69%
20	130	128	219.59	216.22	-1.54%
21	129	139	217.91	234.80	7.75%
22	114	115	192.57	194.26	0.88%
23	117	119	197.64	201.01	1.71%
24	92	96	155.41	162.16	4.35%
25	91	86	153.72	145.27	-5.49%

26	88	92	148.65	155.41	4.55%
27	115	125	194.26	211.15	8.70%
28	115	120	194.26	202.70	4.35%
29	133	164	224.66	277.03	23.31%
30	75	81	126.69	136.82	8.00%

3. COSMETIC TRICHOGRAM

3.1. INCREASE OF ANAGEN PHASE (ΔFA) AND REDUCTION OF TELOGEN PHASE (ΔFT)

VOLUNTEERS	ANAGEN PHASE			TELOGEN PHASE		
	FA ₀	FA ₁₅₀	ΔFA_{150}	FT ₀	FT ₁₅₀	ΔFT_{150}
1	65.2%	75.9%	16.3%	17.4%	20.7%	19.0%
2	61.5%	80.0%	30.0%	19.2%	20.0%	4.0%
3	61.9%	74.1%	19.7%	19.0%	22.2%	16.7%
4	77.3%	79.3%	2.6%	22.7%	17.2%	-24.1%
5	72.2%	81.5%	12.8%	27.8%	14.8%	-46.7%
6	80.0%	89.3%	11.6%	20.0%	10.7%	-46.4%
7	61.5%	81.3%	32.0%	23.1%	9.4%	-59.4%
8	71.9%	82.1%	14.3%	18.8%	14.3%	-23.8%
9	73.1%	84.6%	15.8%	19.2%	11.5%	-40.0%
10	80.0%	92.0%	15.0%	20.0%	8.0%	-60.0%
11	79.2%	84.6%	6.9%	20.8%	15.4%	-26.2%
12	75.9%	86.7%	14.2%	24.1%	10.0%	-58.6%
13	79.3%	85.2%	7.4%	20.7%	14.8%	-28.4%
14	60.7%	84.0%	38.4%	21.4%	16.0%	-25.3%
15	76.0%	69.2%	-8.9%	24.0%	23.1%	-3.8%
16	78.6%	75.0%	-4.5%	21.4%	21.4%	0.0%
17	59.4%	85.7%	44.4%	40.6%	14.3%	-64.8%
18	75.0%	97.2%	29.6%	21.4%	2.8%	-87.0%
19	76.9%	75.0%	-2.5%	23.1%	21.4%	-7.1%
20	78.6%	86.8%	10.5%	21.4%	10.5%	-50.9%
21	53.6%	82.1%	53.3%	25.0%	14.3%	-42.9%
22	78.1%	81.5%	4.3%	21.9%	11.1%	-49.2%
23	74.1%	88.5%	19.4%	25.9%	11.5%	-55.5%
24	73.3%	76.9%	4.9%	26.7%	23.1%	-13.5%
25	74.1%	93.9%	26.8%	18.5%	6.1%	-67.3%
26	80.0%	82.6%	3.3%	20.0%	17.4%	-13.0%
27	48.0%	81.3%	69.3%	40.0%	15.6%	-60.9%

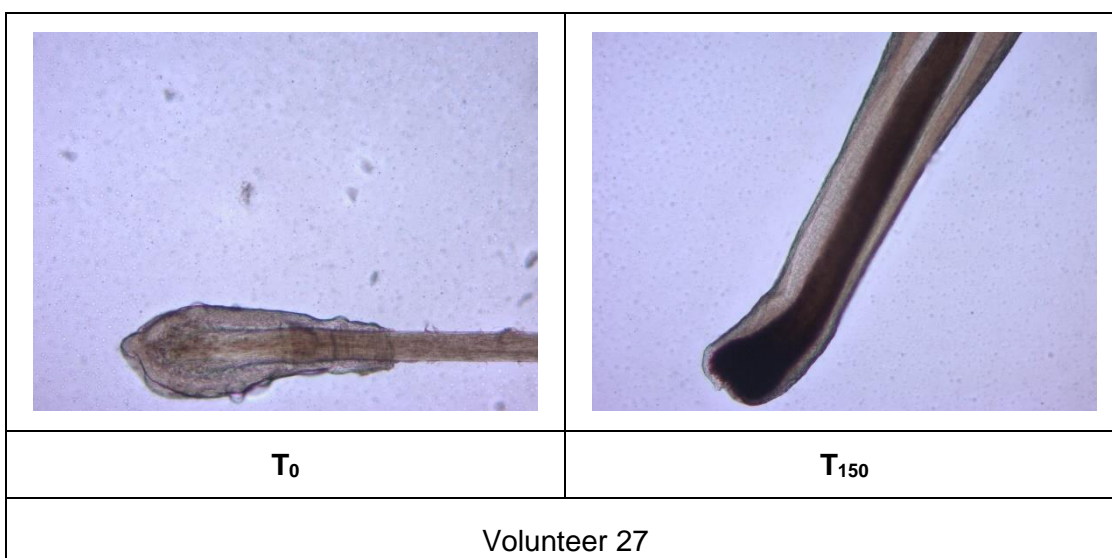
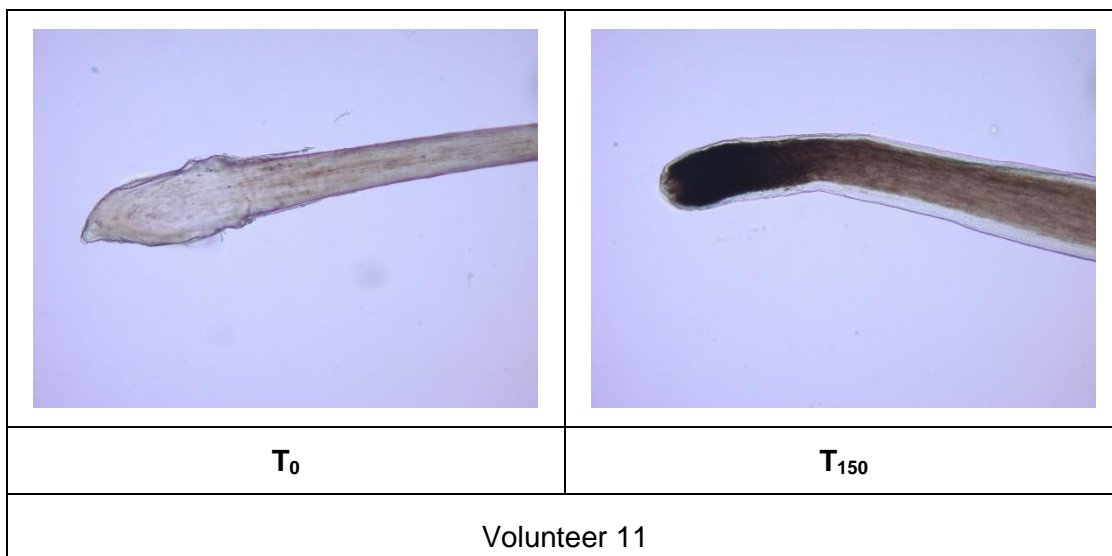
28	76.0%	93.9%	23.6%	24.0%	6.1%	-74.7%
29	71.4%	78.6%	10.0%	23.8%	14.3%	-40.0%
30	77.4%	80.8%	4.3%	22.6%	7.7%	-65.9%


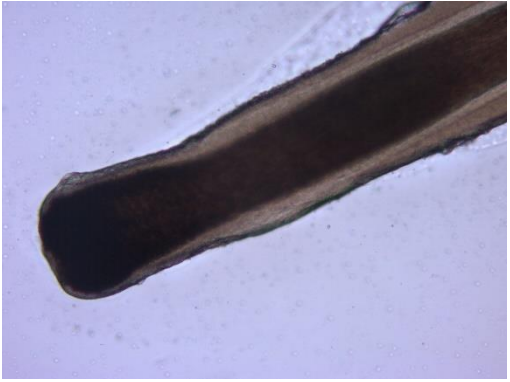
3.2. ANAGEN / TELOGEN RELATIONS

VOLUNTEERS	A ₀	T ₀	A ₀ /T ₀	A ₁₅₀	T ₁₅₀	A ₁₅₀ /T ₁₅₀
1	15	4	3.8	22	6	3.7
2	16	5	3.2	20	5	4.0
3	13	4	3.3	20	6	3.3
4	17	5	3.4	23	5	4.6
5	13	5	2.6	22	4	5.5
6	20	5	4.0	25	3	8.3
7	16	6	2.7	26	3	8.7
8	23	6	3.8	23	4	5.8
9	19	5	3.8	22	3	7.3
10	20	5	4.0	23	2	11.5
11	19	5	3.8	22	4	5.5
12	22	7	3.1	26	3	8.7
13	23	6	3.8	23	4	5.8
14	17	6	2.8	21	4	5.3
15	19	6	3.2	18	6	3.0
16	22	6	3.7	21	6	3.5
17	19	13	1.5	24	4	6.0
18	21	6	3.5	35	1	35.0
19	20	6	3.3	21	6	3.5
20	22	6	3.7	33	4	8.3
21	15	7	2.1	23	4	5.8
22	25	7	3.6	22	3	7.3
23	20	7	2.9	23	3	7.7
24	22	8	2.8	20	6	3.3
25	20	5	4.0	31	2	15.5
26	20	5	4.0	19	4	4.8
27	12	10	1.2	26	5	5.2
28	19	6	3.2	31	2	15.5
29	15	5	3.0	22	4	5.5
30	24	7	3.4	21	2	10.5

4. HAIR ROOTS' PHOTOGRAPHS

In the present report, the three most representative photographs for each group are indexed by way of illustration.



	
T₀	T₁₅₀
Volunteer 30	

5. WASH AND COMBING TEST

VOLUNTEER	C T ₀	C T ₄₅	C T ₁₅₀	W T ₀	W T ₄₅	W T ₁₅₀	C+ W T ₀	C+ W T ₄₅	%REDUCTION OF HAIR LOSS T ₀ vs.T ₄₅	C+ W T ₁₅₀	%REDUCTION OF HAIR LOSS T ₀ vs.T ₁₅₀
1	123	89	93	178	278	154	301	367	21.93	247	-17.94
2	111	105	93	374	667	365	485	772	59.18	458	-5.57
3	88	51	28	135	136	156	223	187	-16.14	184	-17.49
4	67	73	38	253	301	40	320	374	16.88	78	-75.63
5	193	148	76	569	462	392	762	610	-19.95	468	-38.58
6	615	230	87	114	251	202	729	481	-34.02	289	-60.36
7	135	94	48	252	193	69	387	287	-25.84	117	-69.77
8	299	60	71	188	217	98	487	277	-43.12	169	-65.30
9	192	83	40	302	231	87	494	314	-36.44	127	-74.29
10	113	47	39	440	295	185	553	342	-38.16	224	-59.49
11	96	84	65	331	186	208	427	270	-36.77	273	-36.07
12	72	67	44	131	123	93	203	190	-6.40	137	-32.51
13	111	33	35	238	191	138	349	224	-35.82	173	-50.43
14	116	100	18	231	197	65	347	297	-14.41	83	-76.08
15	90	20	15	134	173	72	224	193	-13.84	87	-61.16
16	137	142	65	217	121	132	354	263	-25.71	197	-44.35
17	152	67	27	643	237	107	795	304	-61.76	134	-83.14



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18	133	85	41	396	123	189	529	208	-60.68	230	-56.52
19	122	157	49	187	303	38	309	460	48.87	87	-71.84
20	134	156	109	434	374	313	568	530	-6.69	422	-25.70
21	75	113	34	94	180	152	169	293	73.37	186	10.06
22	112	61	37	151	65	37	263	126	-52.09	74	-71.86
23	79	66	58	182	170	459	261	236	-9.58	517	98.08
24	477	631	104	280	401	297	757	1032	36.33	401	-47.03
25	179	119	84	144	150	68	323	269	-16.72	152	-52.94
26	275	202	13	241	164	64	516	366	-29.07	77	-85.08
27	41	25	12	145	122	62	186	147	-20.97	74	-60.22
28	59	69	93	226	132	58	285	201	-29.47	151	-47.02
29	24	15	10	78	53	51	102	68	-33.33	61	-40.20
30	31	34	19	100	90	41	131	124	-5.34	60	-54.20

C: Combing. W: Washing

6. SURVEY
6.1. T₀

1. Currently, do you have hair loss (pillow, comb...)?	
Yes, intensively	40,0%
Yes, moderately	50,0%
Yes, slightly	10,0%
No	0,0%
2. The hair that falls is:	
Mainly Thick	33,3%
Mainly Thin	46,7%
Both	20,0%
3. Do you notice your hair fragile/weak?	
Yes, intensively	20,0%
Yes, moderately	36,7%
Yes, slightly	20,0%
No	23,3%
4. Do you notice your hair thinner?	
Yes, intensively	16,7%
Yes, moderately	36,7%
Yes, slightly	23,3%
No	23,3%
5. Do you notice a lack of volume?	
Yes, intensively	23,3%
Yes, moderately	30,0%
Yes, slightly	26,7%
No	20,0%
6. Do you observe a reduced capillary density?	
Yes, intensively	23,3%
Yes, moderately	30,0%
Yes, slightly	30,0%
No	16,7%
7. How do you consider the speed of growth of your hair?	
Too slow	26,7%
Normal	63,3%
Too fast	10,0%
8. Is your hair dull?	
Yes, intensively	6,7%
Yes, moderately	46,7%
Yes, slightly	16,7%
No	30,0%

9. Is your hair frizzy?	
Yes, intensively	20,0%
Yes, moderately	26,7%
Yes, slightly	13,3%
No	40,0%
10. Is your hair easily tangled?	
Yes, intensively	30,0%
Yes, moderately	13,3%
Yes, slightly	30,0%
No	26,7%
11. Is your hair dry?	
Yes, intensively	23,3%
Yes, moderately	16,7%
Yes, slightly	23,3%
No	36,7%
12. Is your hair damaged?	
Yes, intensively	13,3%
Yes, moderately	26,7%
Yes, slightly	30,0%
No	30,0%
13. Is your hair roots / scalp oily?	
Yes, intensively	10,0%
Yes, moderately	20,0%
Yes, slightly	33,3%
No	36,7%
14. Do you have dandruff in your hair/on your scalp?	
Yes, intensively	6,7%
Yes, moderately	6,7%
Yes, slightly	30,0%
No	56,7%
15. Is your scalp itchy?	
Yes, intensively	13,3%
Yes, moderately	20,0%
Yes, slightly	30,0%
No	36,7%
16. Do you like your hair aestheticism?	
Yes, intensively	13,3%
Yes, moderately	46,7%
Yes, slightly	33,3%
No	6,7%
17. Do you feel confident regarding the appearance of your hair?	
Yes, intensively	16,7%

Yes, moderately	36,7%
Yes, slightly	30,0%
No	13,3%
No matter	3,3%
18. Do you dye/color your hair?	
Yes	63,3%
No	36,7%
19. Other comments	

6.2. T₄₅

1. General appreciation of the product:	
Pleasant	56,7%
Neither pleasant nor unpleasant	36,7%
Unpleasant	6,7%
2. Is the serum easy to apply on the scalp?	
Yes	96,7%
No	3,3%
3. Does the serum penetrate the scalp easily and quickly?	
Yes	100,0%
No	0,0%
4. Does the lotion let oily / dirty hair?	
Yes	33,3%
No	66,7%
5. Describe:	
<p>Volunteers 6, 16, 21: I feel my hair more greasy. Volunteers 7 and 8: oily feel after application. Volunteers 20 and 22: I feel my hair sticky and dirty. Volunteer 29: I have a little bit hitch after application.</p>	
6. Has the hair loss reduced?	
Yes, intensively	0,0%
Yes, moderately	33,3%
Yes, slightly	43,3%
No	23,3%
7. Has the speed of the growth of the hair increased?	
Yes, intensively	3,3%
Yes, moderately	16,7%
Yes, slightly	33,3%
No	46,7%
8. Has the hair density enhanced?	
Yes, intensively	3,3%
Yes, moderately	13,3%
Yes, slightly	30,0%
No	53,3%
9. Do you notice new hair growing?	
Yes, intensively	0,0%
Yes, moderately	13,3%
Yes, slightly	23,3%
No	63,3%
10. How much?	
A lot	63,6%

Intermediate	27,3%
A little	9,1%
11. Is the number of fallen hair reduced after combing?	
Yes, intensively	3,3%
Yes, moderately	23,3%
Yes, slightly	46,7%
No	26,7%
12. Is the number of fallen hair reduced after washing?	
Yes, intensively	3,3%
Yes, moderately	26,7%
Yes, slightly	46,7%
No	23,3%
13. Is the hair thicker?	
Yes, intensively	0,0%
Yes, moderately	16,7%
Yes, slightly	23,3%
No	60,0%
14. Is the hair strengthened / stronger?	
Yes, intensively	0,0%
Yes, moderately	16,7%
Yes, slightly	36,7%
No	46,7%
15. Has the hair more vitality?	
Yes, intensively	0,0%
Yes, moderately	23,3%
Yes, slightly	50,0%
No	26,7%
16. Is the hair more luminous?	
Yes, intensively	0,0%
Yes, moderately	13,3%
Yes, slightly	46,7%
No	40,0%
17. How would you describe the warming sensation after the serum application?	
Yes, intensively	20,0%
Yes, moderately	33,3%
Yes, slightly	23,3%
No	23,3%
18. Is the hair more voluminous?	
Yes, intensively	0,0%
Yes, moderately	20,0%
Yes, slightly	43,3%
No	36,7%

19. Is the hair less frizzy?*	
Yes, intensively	0,0%
Yes, moderately	22,2%
Yes, slightly	38,9%
No	38,9%
*12 volunteers had not at the beginning of the study	
20. Is the hair less tangled?*	
Yes, intensively	4,5%
Yes, moderately	18,2%
Yes, slightly	22,7%
No	54,5%
*8 volunteers had not at the beginning of the study	
21. Is the hair better hydrated?	
Yes, intensively	6,7%
Yes, moderately	16,7%
Yes, slightly	40,0%
No	36,7%
22. Is the hair less damaged?*	
Yes, intensively	4,8%
Yes, moderately	19,0%
Yes, slightly	57,1%
No	19,0%
*9 volunteers had not at the beginning of the study	
23. Is the oily aspect (hair roots / scalp) reduced?*	
Yes, intensively	0,0%
Yes, moderately	21,1%
Yes, slightly	36,8%
No	42,1%
*11 volunteers had not at the beginning of the study	
24. Is the dandruff in the hair / on the scalp reduced?*	
Yes, intensively	0,0%
Yes, moderately	7,7%
Yes, slightly	46,2%
No	46,2%
*17 volunteers had not at the beginning of the study	
25. Is the scalp less itchy?*	
Yes, intensively	10,5%
Yes, moderately	10,5%
Yes, slightly	36,8%
No	42,1%
*11 volunteers had not at the beginning of the study	
26. Did this serum affect the hair dye's color retention?	
Yes, intensively	0,0%

Yes, moderately	3,3%
Yes, slightly	10,0%
No	86,7%
27. Did the product cause irritation to the scalp after application?	
Yes, intensively	10,0%
Yes, moderately	10,0%
Yes, slightly	20,0%
No	60,0%
28. Are you satisfied with the treatment?	
Yes	63,3%
No	36,7%
29. I think that the lotion has an anti-hair loss effect:	
Yes, intensively	0,0%
Yes, moderately	36,7%
Yes, slightly	50,0%
No	13,3%
30. I think that the lotion has a faster hair growth effect:	
Yes, intensively	6,7%
Yes, moderately	10,0%
Yes, slightly	46,7%
No	36,7%
31. I think that the lotion is effective to grow new hair (to increase capillary density):	
Yes, intensively	6,7%
Yes, moderately	10,0%
Yes, slightly	46,7%
No	36,7%
32. I think that the lotion is effective to make the hair easier to manage:	
Yes, intensively	10,0%
Yes, moderately	20,0%
Yes, slightly	40,0%
No	30,0%
33. I prefer my hair aestheticism than before starting the treatment	
Yes, intensively	3,3%
Yes, moderately	23,3%
Yes, slightly	30,0%
No	30,0%
No matter	13,3%
34. I feel more confident thanks to the appearance of my hair	
Yes, intensively	3,3%
Yes, moderately	23,3%
Yes, slightly	20,0%
No	30,0%
No matter	23,3%

35. Would you buy this product?	
Yes	56,7%
No	43,3%
36. Does the product cause discomfort in the scalp?	
Yes	23,3%
No	76,7%
37. Describe:	
<p>Volunteer 5: a little bit of irritation during product application, with heat in the scalp. Volunteer 6: itch in the scalp and greasy feeling. Volunteers 7 and 26: itch. Volunteer 12: stinging in the scalp. Volunteers 18 and 21: my hair get dirty quickly. Volunteer 19: at the beginning I felt stinging, now this feeling has gone. Volunteer 20: a little bit of itch. Volunteer 24: heat in the scalp during application.</p>	
38. Did you experience headaches with the product?	
Yes	3,3%
No	96,7%
39. Other comments:	

6.3. T₁₅₀

1. General appreciation of the product:	
Pleasant	73.3%
Neither pleasant nor unpleasant	23.3%
Unpleasant	3.3%
2. Is the serum easy to apply on the scalp?	
Yes	96.7%
No	3.3%
3. Does the serum penetrate the scalp easily and quickly?	
Yes	93.3%
No	6.7%
4. Does the lotion let oily / dirty hair?	
Yes	23.3%
No	76.7%
5. Describe:	
Volunteers 6, 16 and 21: I felt my hair more greasy Volunteer 29: I have hitch after product application	
6. Has the hair loss reduced?	
Yes, intensively	16.7%
Yes, moderately	63.3%
Yes, slightly	16.7%
No	3.3%
7. Has the speed of the growth of the hair increased?	
Yes, intensively	13.3%
Yes, moderately	33.3%
Yes, slightly	33.3%
No	20.0%
8. Has the hair density enhanced?	
Yes, intensively	10.0%
Yes, moderately	30.0%
Yes, slightly	26.7%
No	33.3%
9. Do you notice new hair growing?	
Yes, intensively	13.3%
Yes, moderately	30.0%
Yes, slightly	23.3%
No	33.3%
10. How much?	
A lot	20.0%
Intermediate	75.0%

A little	5.0%
11. Is the number of fallen hair reduced after combing?	
Yes, intensively	30.0%
Yes, moderately	36.7%
Yes, slightly	26.7%
No	6.7%
12. Is the number of fallen hair reduced after washing?	
Yes, intensively	23.3%
Yes, moderately	46.7%
Yes, slightly	23.3%
No	6.7%
13. Is the hair thicker?	
Yes, intensively	6.7%
Yes, moderately	16.7%
Yes, slightly	23.3%
No	53.3%
14. Is the hair strengthened / stronger?	
Yes, intensively	10.0%
Yes, moderately	20.0%
Yes, slightly	40.0%
No	30.0%
15. Has the hair more vitality?	
Yes, intensively	10.0%
Yes, moderately	26.7%
Yes, slightly	43.3%
No	20.0%
16. Is the hair more luminous?	
Yes, intensively	13.3%
Yes, moderately	23.3%
Yes, slightly	33.3%
No	30.0%
17. How would you describe the warming sensation after the serum application?	
Yes, intensively	20.0%
Yes, moderately	23.3%
Yes, slightly	20.0%
No	36.7%
18. Is the hair more voluminous?	
Yes, intensively	10.0%
Yes, moderately	26.7%
Yes, slightly	30.0%
No	33.3%
19. Is the hair less frizzy?*	

Yes, intensively	5.3%
Yes, moderately	31.6%
Yes, slightly	10.5%
No	52.6%
*11 volunteers had not at the beginning of the study	
20. Is the hair less tangled?*	
Yes, intensively	4.5%
Yes, moderately	27.3%
Yes, slightly	18.2%
No	50.0%
*8 volunteers had not at the beginning of the study	
21. Is the hair better hydrated?	
Yes, intensively	3.3%
Yes, moderately	30.0%
Yes, slightly	36.7%
No	30.0%
22. Is the hair less damaged?*	
Yes, intensively	5.3%
Yes, moderately	26.3%
Yes, slightly	31.6%
No	36.8%
*11 volunteers had not at the beginning of the study	
23. Is the oily aspect (hair roots / scalp) reduced?*	
Yes, intensively	5.0%
Yes, moderately	25.0%
Yes, slightly	25.0%
No	45.0%
*10 volunteers had not at the beginning of the study	
24. Is the dandruff in the hair / on the scalp reduced?*	
Yes, intensively	7.1%
Yes, moderately	14.3%
Yes, slightly	42.9%
No	35.7%
*16 volunteers had not at the beginning of the study	
25. Is the scalp less itchy?*	
Yes, intensively	15.8%
Yes, moderately	36.8%
Yes, slightly	21.1%
No	26.3%
*11 volunteers had not at the beginning of the study	
26. Did this serum affect the hair dye's color retention?*	
Yes, intensively	4.8%
Yes, moderately	9.5%

Yes, slightly	0.0%
No	85.7%
*9 volunteers had not at the beginning of the study	
27. Did the product cause irritation to the scalp after application?	
Yes, intensively	0.0%
Yes, moderately	6.7%
Yes, slightly	16.7%
No	76.7%
28. Are you satisfied with the treatment?	
Yes	93.3%
No	6.7%
29. I think that the lotion has an anti-hair loss effect:	
Yes, intensively	20.0%
Yes, moderately	33.3%
Yes, slightly	40.0%
No	6.7%
30. I think that the lotion has a faster hair growth effect:	
Yes, intensively	10.0%
Yes, moderately	26.7%
Yes, slightly	46.7%
No	16.7%
31. I think that the lotion is effective to grow new hair (to increase capillary density):	
Yes, intensively	10.0%
Yes, moderately	20.0%
Yes, slightly	46.7%
No	23.3%
32. I think that the lotion is effective to make the hair easier to manage:	
Yes, intensively	6.7%
Yes, moderately	20.0%
Yes, slightly	43.3%
No	30.0%
33. I prefer my hair aestheticism than before starting the treatment	
Yes, intensively	6.7%
Yes, moderately	23.3%
Yes, slightly	33.3%
No	36.7%
34. I feel more confident thanks to the appearance of my hair	
Yes, intensively	10.0%
Yes, moderately	13.3%
Yes, slightly	26.7%
No	50.0%
35. Would you buy this product?	

Yes	76.7%
No	23.3%
36. Does the product cause discomfort in the scalp?	
Yes	3.3%
No	96.7%
37. Describe: Volunteer 5: Small irritation	
38. Did you experience headaches with the product?	
Yes	6.7%
No	93.3%
39. Other comments:	

III. DISCUSSION

GENERAL PHOTOGRAPHS

Without a doubt, when an efficacy study is performed of a regenerative hair treatment it is desirable for the results to be appreciated to the naked eye even though it is not always possible to distinguish the differences since it takes more time for the hair to reach its adult age, between 3 to 5 years. When the treatment manages to increase the amount of hairs, the general photograph of the scalp is a simple test that clearly demonstrates the success of the treatment.

In this experiment, in general differences are observed between the times studied. The pictures show in the report are by way of an example only and, for example, in the case with volunteers 3 and 8 we can see a difference where the appearance of new hair is observed after 150 days of treatments in the parting areas. In addition, in volunteers 19 we can observe an increase in hair density in the same part of the hair after 150 days of treatment.

HAIR DENSITY

In the case of capillary density (indicated in number of hairs per cm²), in general the values obtained after the product applications are greater than those of the volunteers at the beginning of it; indicating the product's capacity to generate new hair.

This can be clearly observed in Figure 1, where the percentage of volunteers in which the treatment has had a positive (increased density), effect is represented.

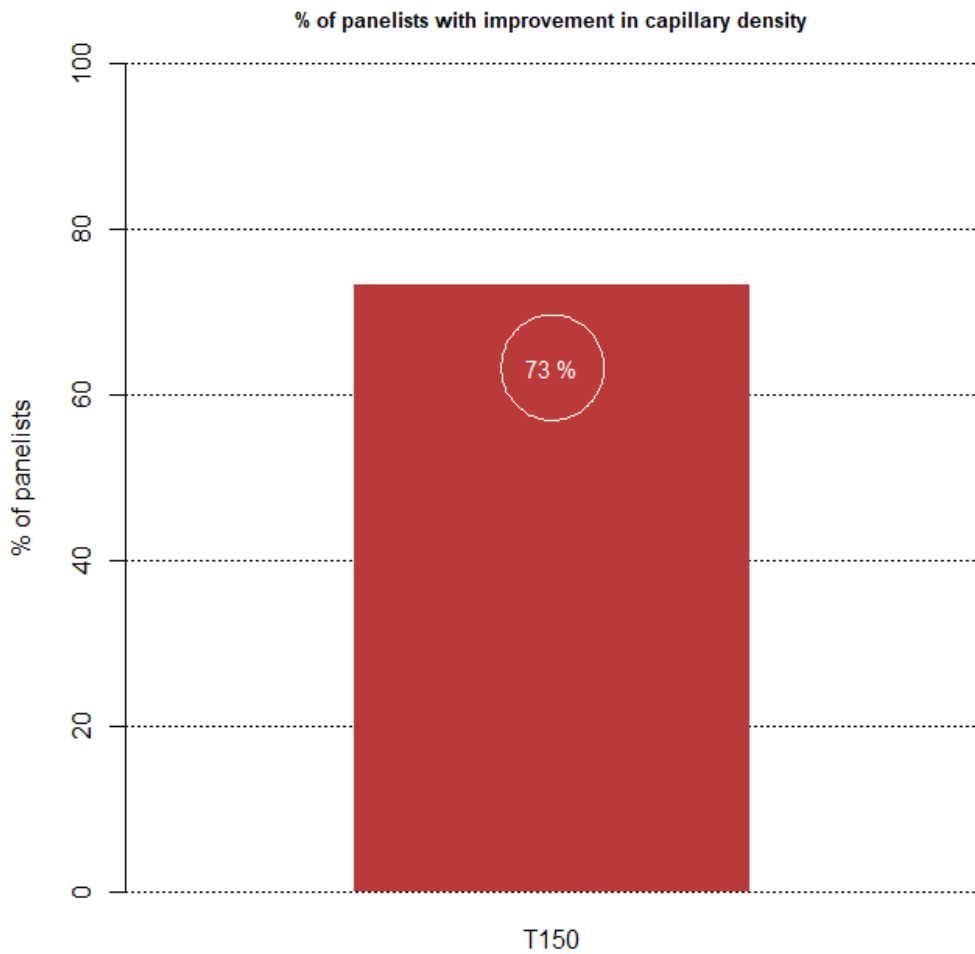


Figure 1. Effect on Capillary Density after 150 days of treatments.

It is observed that after 150 days of applications, 73.3% of the volunteers involved in the study have a higher capillary density.

Observing the data obtained at T₁₅₀, we can say that the tested product is able to increase the capillary density up to 23.31% (volunteer 29) with an average value of 5.28%.

Taking into account only the volunteers with higher capillary density at T₁₅₀, we can say that the tested product is able to increase the capillary density an average value of 8.64%.

Statistical study of hair density values:

Capillary density (1/cm ²)		
	T₀	T₁₅₀
Average	173.31	182.83
Standard deviation	38.37	44.86
Minimum	103.04	101.35
Maximum	261.82	293.92
% of variation absolute respect to T0	-	5%
% of panelists with improvement	-	73%
LINEAR MIXED-EFFECTS MODEL		
Predicted average	173.86	181.53
Standard error	7.57	2.29
t value	-	3.36
p value	-	2.22E-03
Significance	-	S

150 days after product application, capillary density increases an average of 5% relative to baseline. This difference is statistically significant with a p-value lower than 0.05.

INCREASE OF ANAGEN PHASE (Δ FA) AND REDUCTION OF TELOGEN PHASE (Δ FT)

It is clear that a regenerative and anti-hair loss treatment must be able to increase the percentage of hairs in anagen phase, as well as decrease the hairs in telogen phase.

Figures 2 and 3 shows the percentage of volunteers for whom the treatment has had a positive effect (anagen increase and telogen decrease).

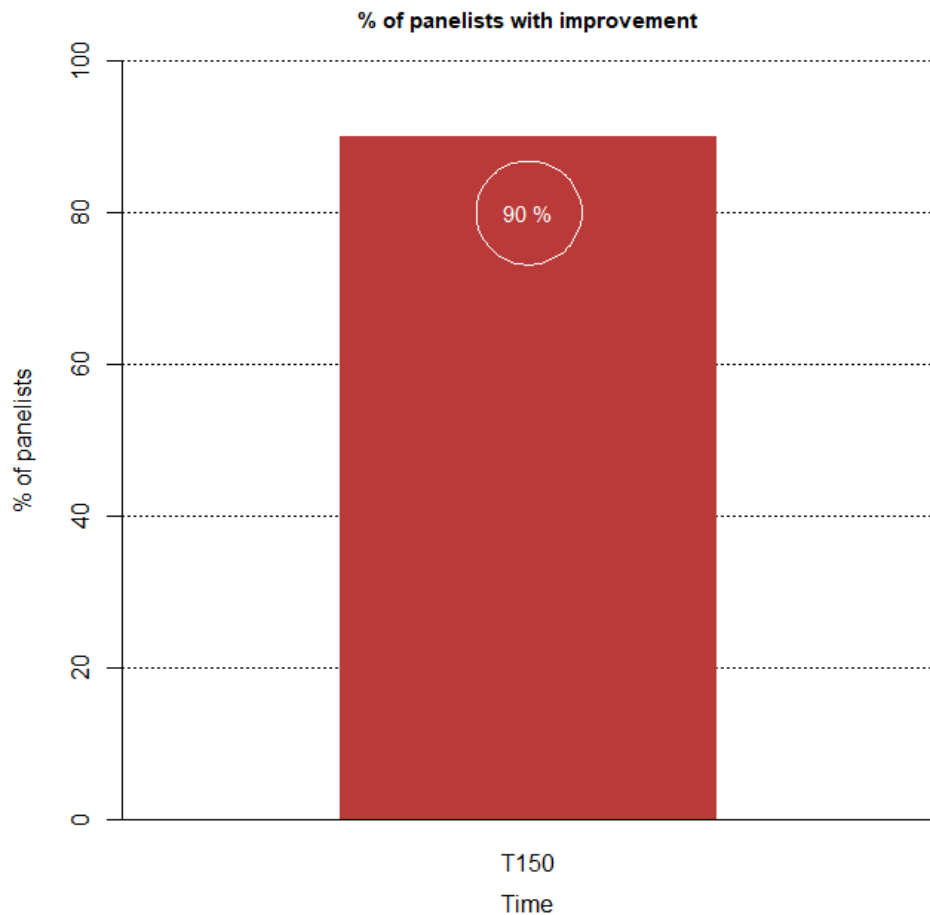


Figure 2. Positive effect in the anagen phases (increase) after 150 days of treatment.

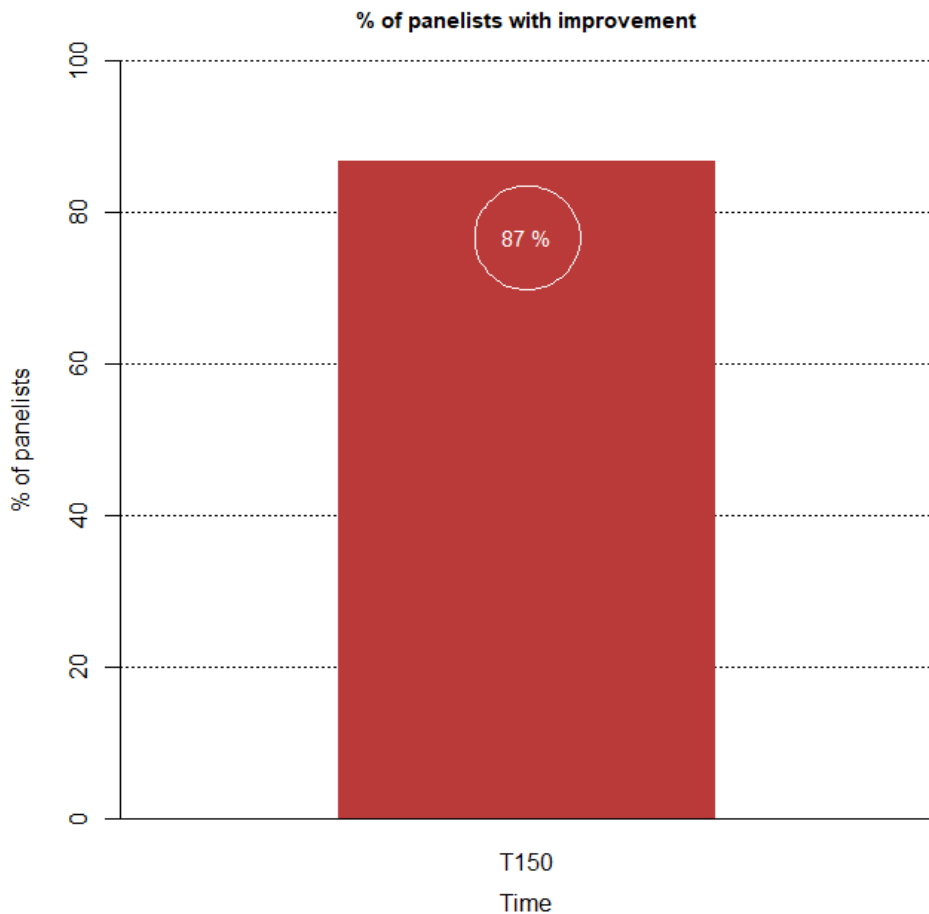


Figure 3. Positive effect in the telogen phases (reduction) after 150 days of treatment.

It is observed that the tested product causes a positive effect in 90.0% of volunteers in the anagen phases (increasing). 86.6% of volunteers show a positive effect in the telogen phases (reduction). This would be indicative that the product is able to prolong the growth phases (anagen) of the hair. Calculating the average values of the increase and/or decrease of anagenous and/or telogenous phases we obtain 17.5% increase in the case of the anagen phases and a 36.5% decrease in the case of the telogenous phases.

Taking into account only the volunteers with anagen phases increasing or telogen phases reduction, Calculating the average values (taking into account only the volunteers with anagen phases increasing or telogen phases reduction (positive effect)) we obtain 20.03% increase in the case of the anagen phases and a 43.67% decrease in the case of the telogenous phases.

Statistical study of increase of anagen phase and reduction of telogen phase values:

Increase in anagen phase		
	T ₀	T ₁₅₀
Average	0.72	0.83
Standard deviation	0.09	0.06
Minimum	0.48	0.69
Maximum	0.80	0.97
% of variation absolute respect to T0	-	16%
% of panelists with improvement	-	90%
LINEAR MIXED-EFFECTS MODEL (T ₁₅₀ Vs T ₀)		
Predicted average	0.72	0.84
Standard error	0.02	0.02
t value	-	7.18
p value	-	6.57E-08
Significance	-	S

After 150 days of product, values Anagen phase is increased on average by 16% in relation to the baseline. This difference is statistically significant with a p-value lower than 0.05.

Increase in telogen phase		
	T ₀	T ₁₅₀
Average	0.23	0.14
Standard deviation	0.05	0.05
Minimum	0.17	0.03
Maximum	0.41	0.23
% of variation absolute respect to T0	-	-39%
% of panelists with improvement	-	87%
WILCOXON SIGNED RANK TEST (T ₁₅₀ Vs T ₀)		
V	-	423.00
p value	-	9.30E-06
Significance	-	S

After 150 days of product, values Telogen phase is decreased on average by 39% in relation to the baseline. This difference is statistically significant with a p-value lower than 0.05.

PERCENTAGE BETWEEN HAIRS IN THE ANAGEN AND THE TELOGEN PHASE

It is clear that a regenerative and anti-hair loss treatment must be able to increase the percentage of hairs in anagen phase as well as decrease the hairs in telogen phase. It means, the relations A/T must be increased.

In this case we can observe that 90.0% of the volunteers show an increase in the A/T ratio after 150 days of treatment (see figure 4).

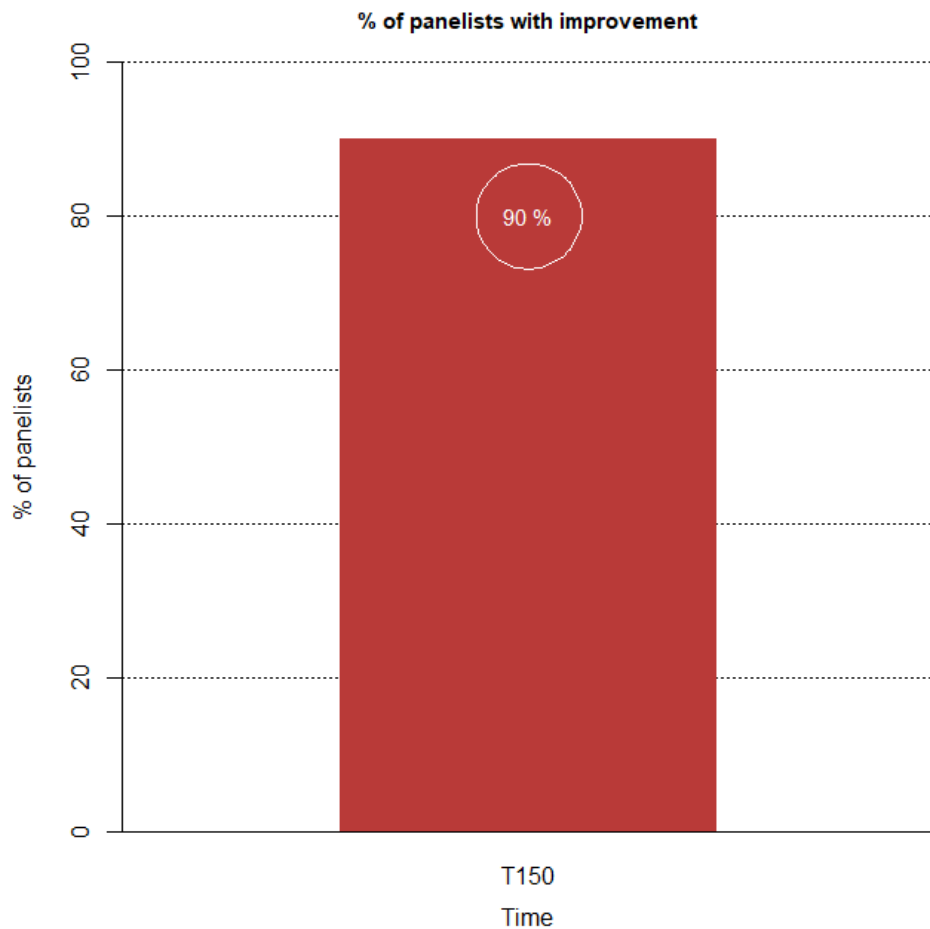


Figure 4: Volunteers with an increase in the A/T ratio after 150 days of treatment.

Statistical study of A/T values:

Relation - (Anagen/Telogen) _i		
	T ₀	T ₁₅₀
Average	3.23	7.60
Standard deviation	0.70	6.09
Minimum	1.20	3.00
Maximum	4.00	35.00
% of variation absolute respect to T ₀	-	135%
% of panelists with improvement	-	90%
WILCOXON SIGNED RANK TEST (T ₁₅₀ Vs T ₀)		
V	-	9.50
p value	-	4.71E-06
Significance	-	S

After 150 days of product, relation of (Anagen/Telogen) is increased on average by 135% in relation to the baseline. This difference is statistically significant with a p-value lower than 0.05.

HAIR ROOTS' PHOTOGRAPHS

Volunteer 11:

Before product application, a poorly developed root is observed with a low cellular activity. It corresponds with a clear telogen phase.

In contrast, after 150 days of product application, we can see a root with a presence of hair sheaths with good cellular activity, which correspond to an anagen hair.

Volunteer 27:

At the beginning of the experiment, an irregular root is observed, without the presence of hair sheaths. It corresponds with a clear telogen phase.

At the end of the experiment, the root has increased in thickness with respect to T_0 and has well-developed sheaths with good adherence to the follicle.

Volunteer 30:

At the beginning of the experiments, an irregular root is observed, without the presence of hair sheaths. It is poorly developed with poorly compacted and cohesive keratins

At the end of the experiment, the root has increased in thickness with respect to T_0 and has well-developed sheaths with good adherence to the follicle.

WASH AND COMBING TESTS

A way to determine the hair loss efficacy of the treatment under study is the determination of the number of volunteers where the treatment has had a positive effect over hair loss (decrease), in figure 5 and 6 such percentages are represented for each time.

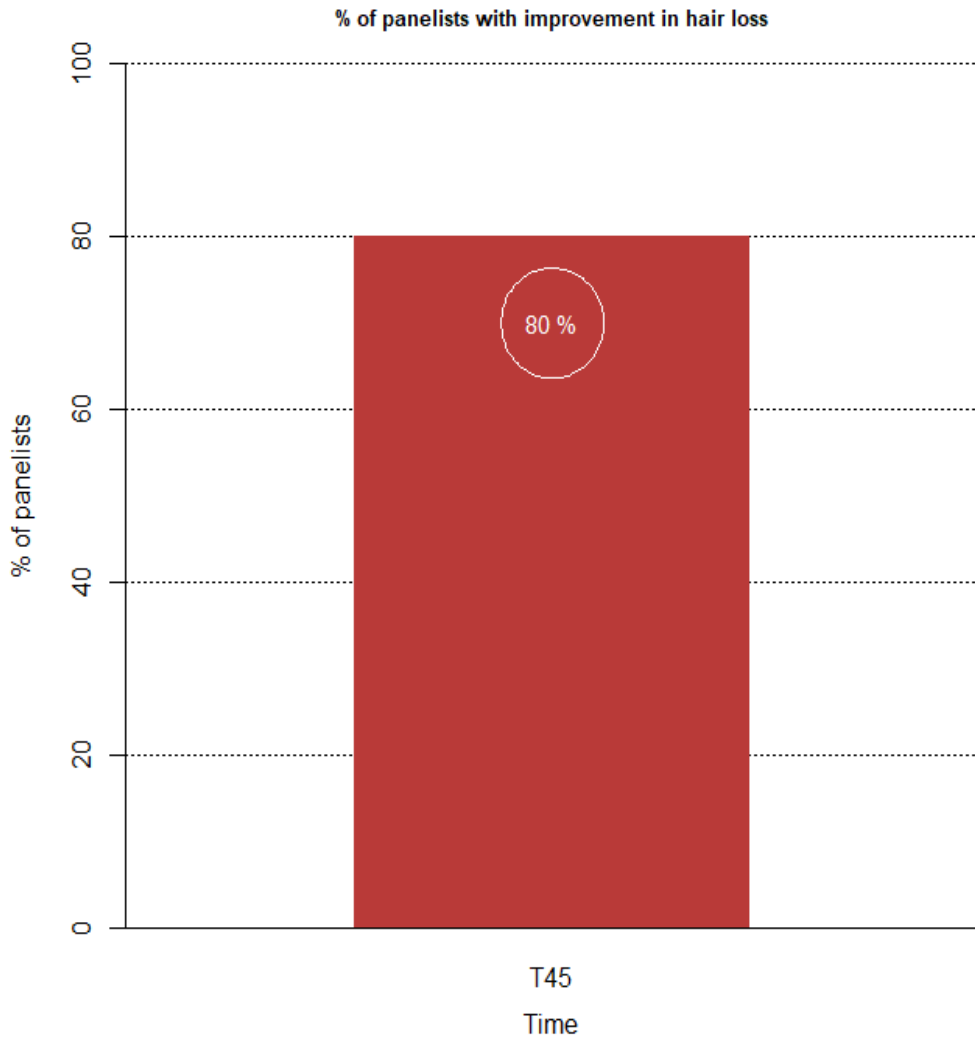


Figure 5: Positive effect of the treatment on hair loss after 45 days of treatments.

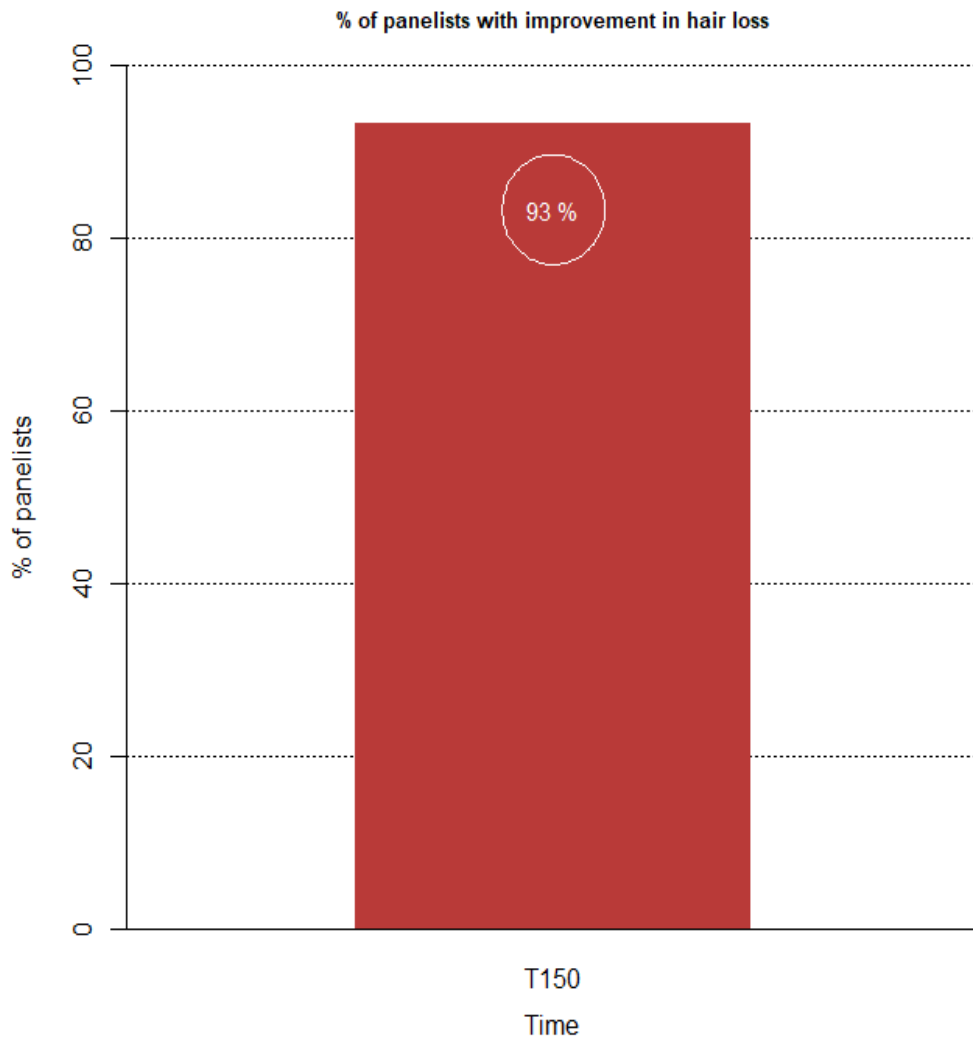


Figure 6: Positive effect of the treatment on hair loss after 150 days of treatments.

After 45 days of treatment we can observe that 80.0% of the volunteers have a reduction in hair loss. This reduction has an average value of 13.86% with a maximum value of 61.76% (volunteer 17).

Taking into account only the volunteers with reduction in hair loss, this reduction has an average value of 28.01%

After 150 days of treatment we can observe that 93.3% of the volunteers have a reduction in hair loss. This reduction has an average value of 45.75% with a maximum value of 85.08% (volunteer 26).

Taking into account only the volunteers with reduction in hair loss, this reduction has an average value of 52.88%

Statistical study of values:

Combing + Wash test		
	T ₀	T ₄₅
Average	394.63	327.07
Standard deviation	192.88	200.62
Minimum	102.00	68.00
Maximum	795.00	1032.00
% of variation absolute respect to T0	-	-17%
% of panelists with improvement	-	80%
WILCOXON SIGNED RANK TEST (T ₀ VS T ₄₅)		
V	-	351.50
p value	-	0.01
Significance	-	S

45 days after product application, hairs loss decreases an average of 17% relative to baseline. This difference is statistically significant with a p-value lower than 0.05.

Combing + Wash test		
	T ₀	T ₁₅₀
Average	394.63	197.90
Standard deviation	192.88	132.96
Minimum	102.00	60.00
Maximum	795.00	517.00
% of variation absolute respect to T0	-	-50%
% of panelists with improvement	-	93%
LINEAR MIXED-EFFECTS MODEL (T ₀ VS T ₁₅₀)		
Predicted average	372.76	185.06
Standard error	30.09	29.85
t value	-	-6.29
p value	-	7.26E-07
Significance	-	S

150 days after product application, hairs loss decreases an average of 50% relative to baseline. This difference is statistically significant with a p-value lower than 0.05.

VOLUNTEERS' SURVEYS

Initial time T₀:

- At the beginning of the experiment, volunteers were asked about if they had hair loss. 100.0% of the volunteers had hair loss.
- At the beginning of the experiment, volunteers were asked about if they had their hair fragile. 76.7% of the volunteers thought it.
- At the beginning of the experiment, volunteers were asked about if they had their hair thin. 76.7% of the volunteers thought it.
- At the beginning of the experiment, volunteers were asked about if they had observed lack of volume in their hair. 80.0% of the volunteers had observed lack of volume in their hair.
- At the beginning of the experiment, volunteers were asked about if they had observed reduction in hair density. 83.3% of the volunteers had observed reduction in hair density.
- At the beginning of the experiment, volunteers were asked how they considered the speed of growth of their hair. 26.7% of the volunteers thought that it was too slow and 63.3% of the volunteers thought that it was normal.
- At the beginning of the experiment, volunteers were asked about if they hair was dull. 70.0% of the volunteers thought that the hair was dull.
- At the beginning of the experiment, volunteers were asked about if they had frizzy hair. 60.0% of the volunteers thought they have frizzy hair.
- At the beginning of the experiment, volunteers were asked about if they had their hair dry. 63.3% of the volunteers thought their hair was dry.
- At the beginning of the experiment, volunteers were asked about if their scalp was oily. 63.3% of the volunteers thought to have oily scalp.
- At the beginning of the experiment, volunteers were asked about if they had dandruff. 43.3% of the volunteers thought to have it.
- At the beginning of the experiment, volunteers were asked about if they had itch in their scalp. 63.3% of the volunteers had itch in their scalp.
- At the beginning of the experiment, volunteers were asked about if they felt confident regarding the appearance of their hair. 83.4% of the volunteers felt confident regarding the appearance of their hair.

T₄₅:

After 45 days of product applications, volunteers were asked about the global appreciation of the product. 56.7% of the volunteers thought it was pleasant (Figure 7).

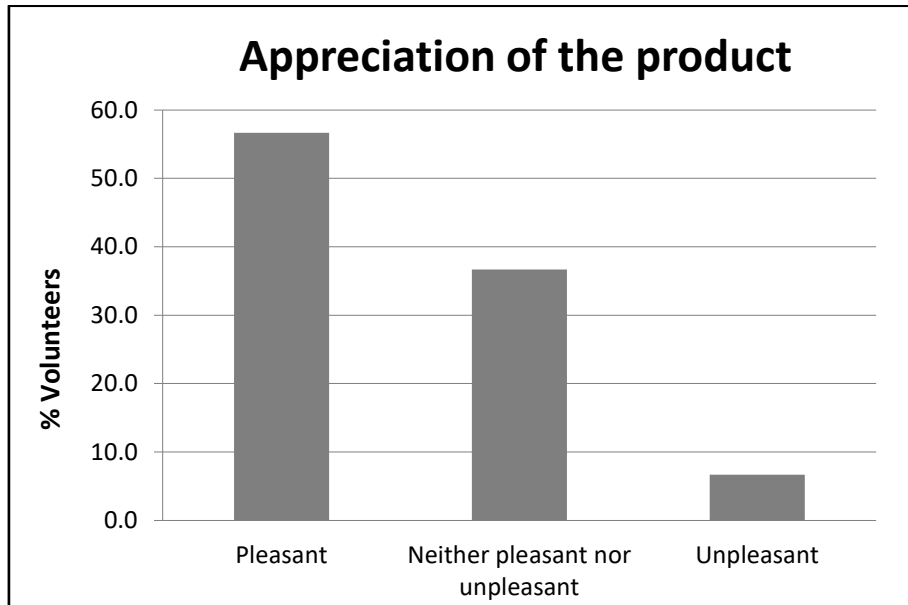


Figure 7: Appreciation of the product after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked about the ease of application of the product. 96.7% of the volunteers thought it was easy.

After 45 days of product applications, volunteers were asked if the product penetrated easily and quickly to the scalp. 100.0% of the volunteers thought it penetrated easily.

After 45 days of product applications, volunteers were asked if the product get dirty their hair. 66.7% of the volunteers thought it was not the case.

After 45 days of product applications, volunteers were asked if the hair loss was reduced. 76.7% of the volunteers thought that hair loss was reduced (Figure 8).

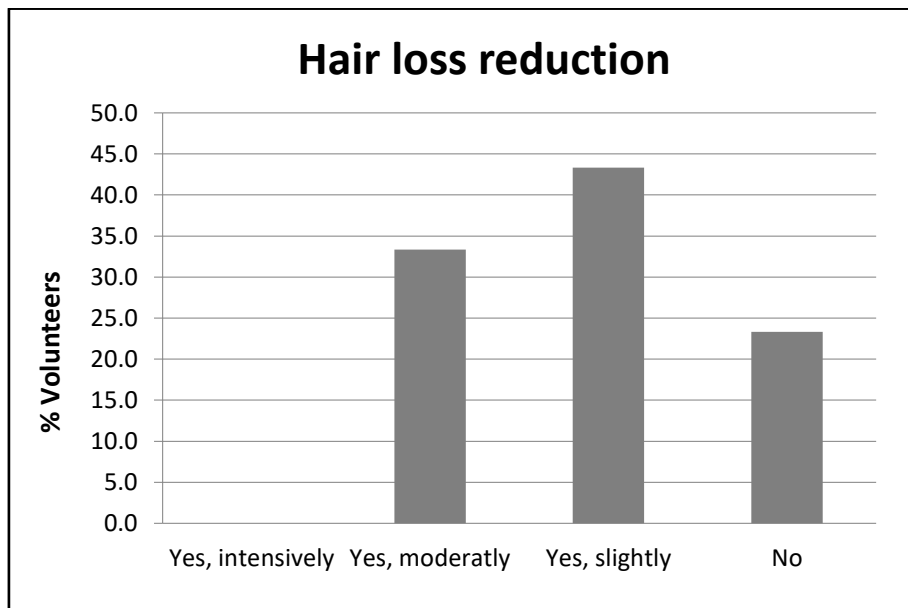


Figure 8: Subjective assessment of the hair loss reduction after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked if the speed of the growth of their hair had increased. 3.3% of the volunteers thought that the increase was intense, 16.7% of the volunteers thought that the increase was moderate.

After 45 days of product applications, volunteers were asked if the hair density had enhanced. 3.3% of the volunteers thought that the enhanced was intense, 13.3% of the volunteers thought that the enhanced was moderate (Figure 9).

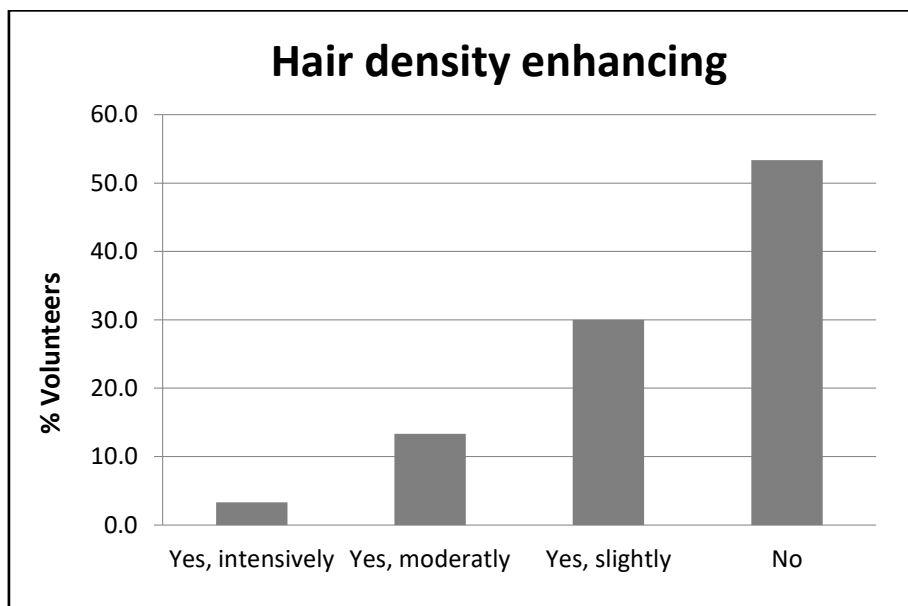


Figure 9: Subjective assessment of the hair density enhanced after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked if they had observed the growth of new hair. 36.7% of the volunteers had observed the growth of new hair.

After 45 days of product applications, volunteers were asked if the number of fallen hair after combing was reduced. 3.3% of the volunteers thought that the reduction was intense, 23.3% of the volunteers thought that the reduction was moderate (Figure 10).

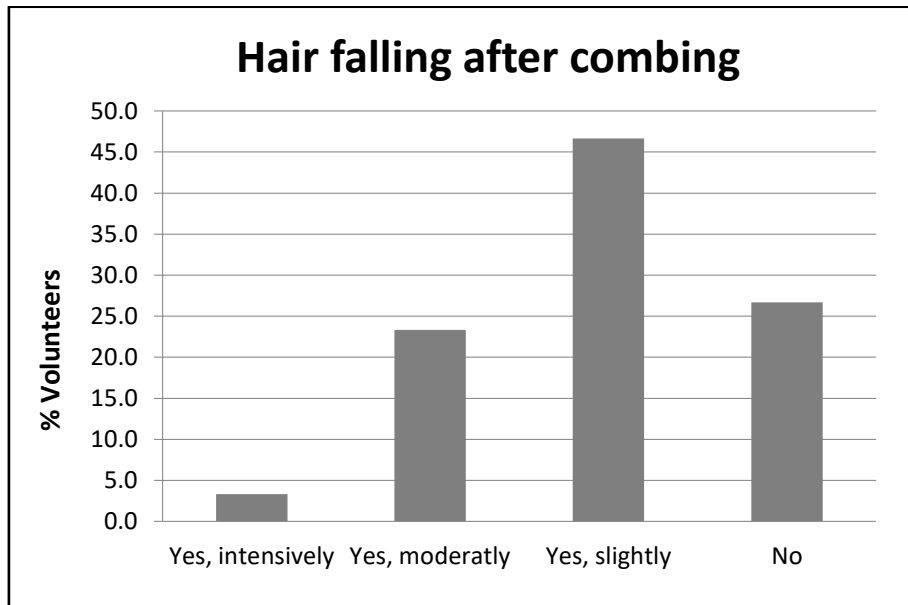


Figure 10: Subjective assessment of the hair fallen reduction after combing after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked if the number of fallen hair after washing was reduced. 3.3% of the volunteers thought that the reduction was intense, 26.7% of the volunteers thought that the reduction was moderate.

After 45 days of product applications, volunteers were asked about if they had their hair thicker. 16.7% of the volunteers thought it was moderately thicker.

After 45 days of product applications, volunteers were asked about if their hair was stronger. 16.7% of the volunteers thought it was moderately stronger (Figure 11).

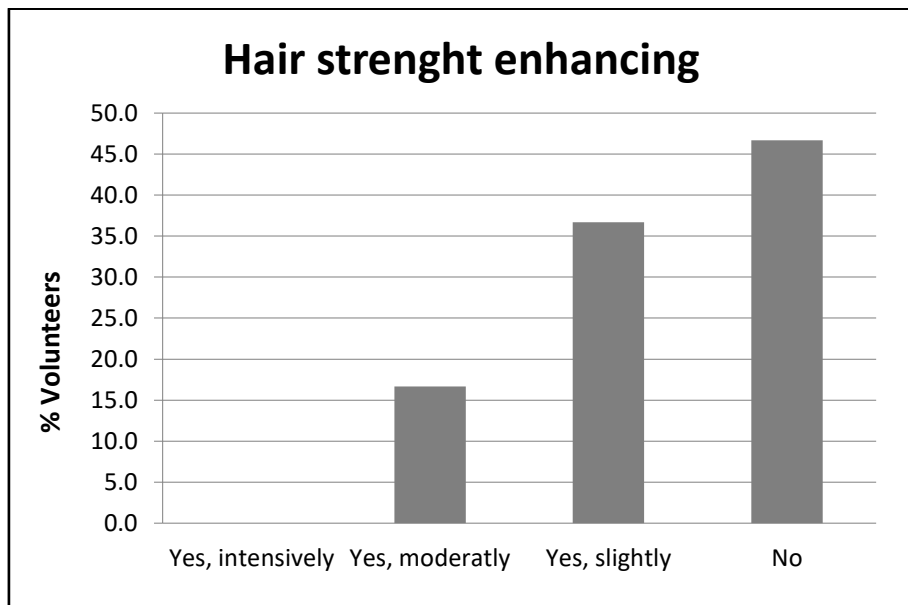


Figure 11: Subjective assessment of the hair strength after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked about if their hair had more vitality. 23.3% of the volunteers thought that the hair vitality increase was moderate.

After 45 days of product applications, volunteers were asked about if their hair was more luminous. 13.3% of the volunteers thought that the increase of shine was moderate. (Figure 12).

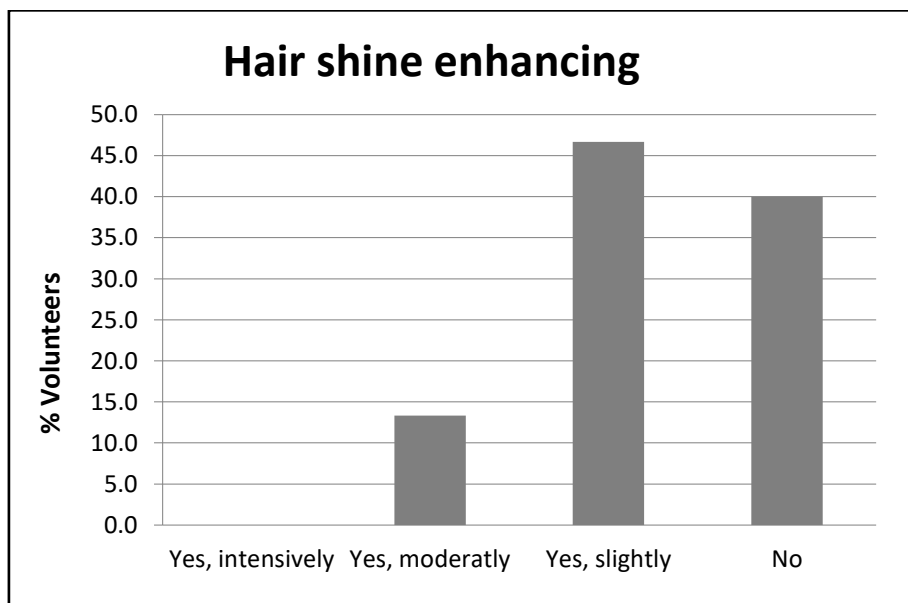


Figure 12: Subjective assessment of the hair shine increase after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked about if they felt a warming sensation after product application. 20.0% of the volunteers described this feeling as intense and 33.3% of the volunteers described this feeling as moderate.

After 45 days of product applications, volunteers were asked about if their hair was more voluminous. 20.0% of the volunteers thought that the increase in volume was moderate.

After 45 days of product applications, volunteers were asked about if their hair was less frizzy. 22.2% of the volunteers thought that the reduction was moderate (Figure 13).

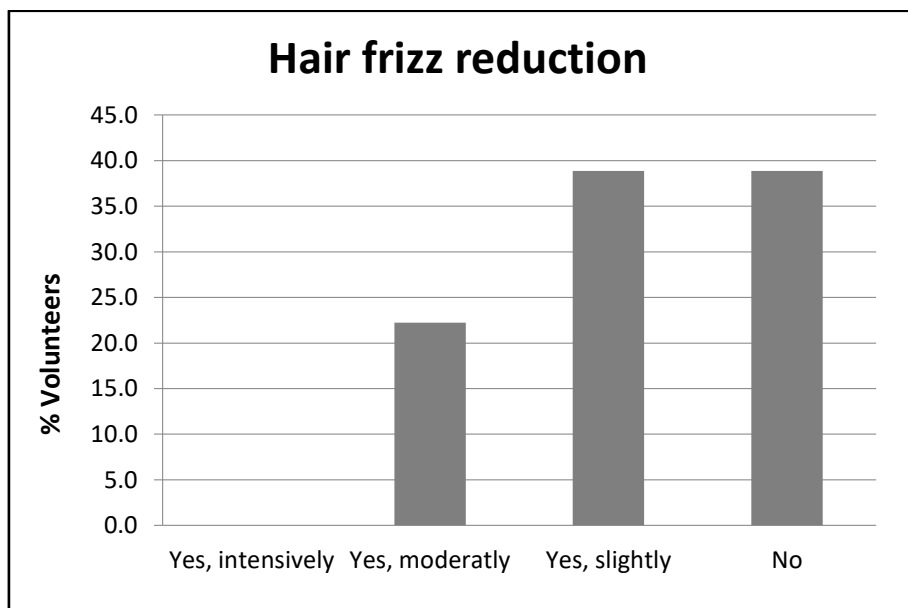


Figure 13: Subjective assessment of the frizz reduction after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked about if their hair was less tangled. 4.5% of the volunteers thought that the reduction was intense, 18.2% of the volunteers thought that the reduction was moderate.

After 45 days of product applications, volunteers were asked about if their hair was better hydrated. 6.7% of the volunteers thought that the enhanced in hydration was intense and 16.7% of the volunteers thought that the enhanced in hydration was moderate (Figure 14).

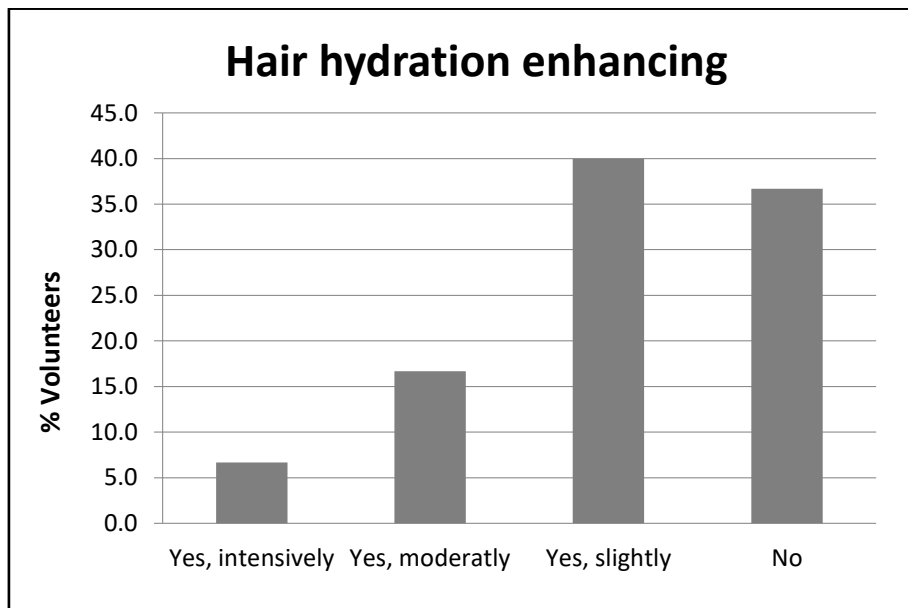


Figure 14: Subjective assessment of the hydration enhanced after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked about if their hair was less damaged. 4.8% of the volunteers thought that the reduction was intense and 19.0% of the volunteers thought that the reduction was moderate.

After 45 days of product applications, volunteers were asked about if the oily aspect of scalp was reduced. 21.1% of the volunteers thought that the reduction was moderate (Figure 15).

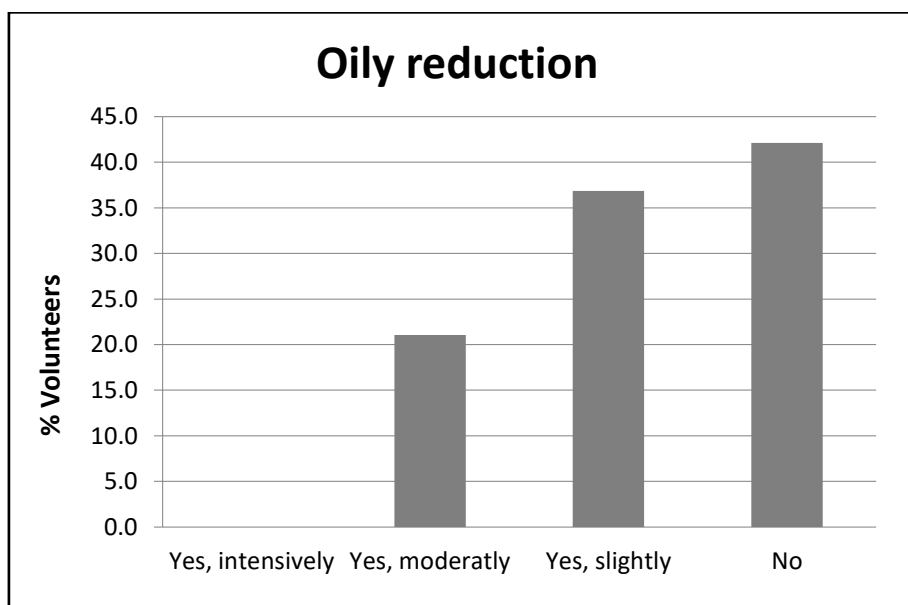


Figure 15: Subjective assessment of the scalp oily aspect reduction after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked about if the level of dandruff was reduced. 7.7% of the volunteers thought that the reduction was moderate.

After 45 days of product applications, volunteers were asked about if the itch in the scalp was reduced. 10.5% of the volunteers thought that the reduction was intense and 10.5% of the volunteers thought that the reduction was moderate (Figure 16).

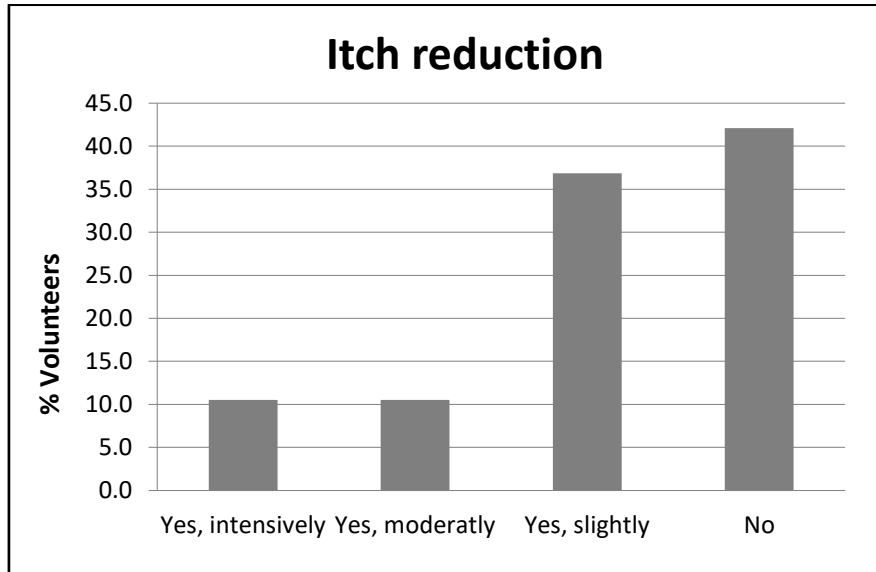


Figure 16: Subjective assessment of the itch reduction after 45 days of applications (n=30).

63.3% of the volunteers are satisfied with the tested product (Figure 17).

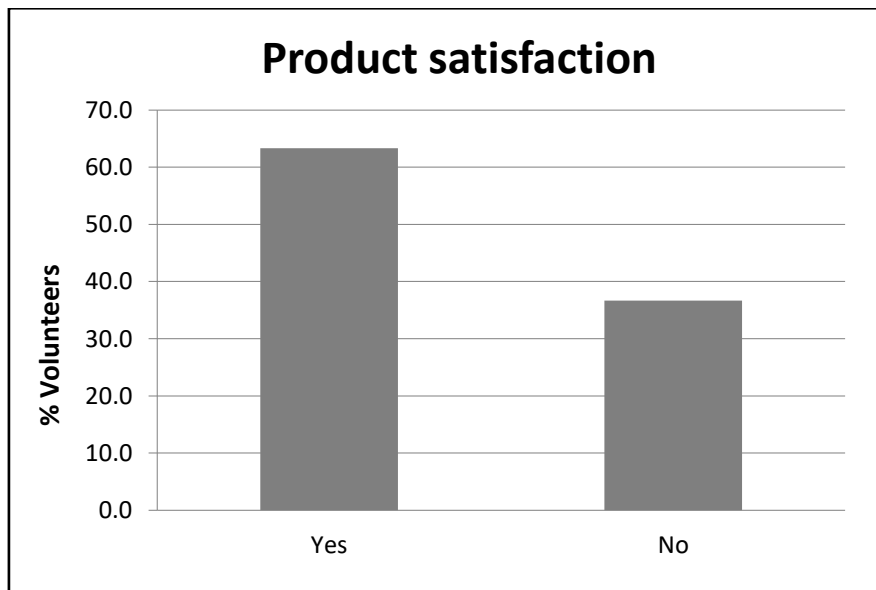


Figure 17: Product satisfaction after 45 days of applications (n=30).

After 45 days of product applications, volunteers were asked about if the lotion had an anti-hair loss effect. 36.7% of the volunteers thought that this effect was moderate.

After 45 days of product applications, volunteers were asked about if the lotion did hair growth faster. 6.7% of the volunteers thought that this effect was intense, 10.0% of the volunteers thought that that this effect was moderate.

After 45 days of product applications, volunteers were asked about if the lotion was effective to increase the hair density. 6.7% of the volunteers thought that this effect was intense, 10.0% of the volunteers thought that that this effect was moderate (Figure 18).

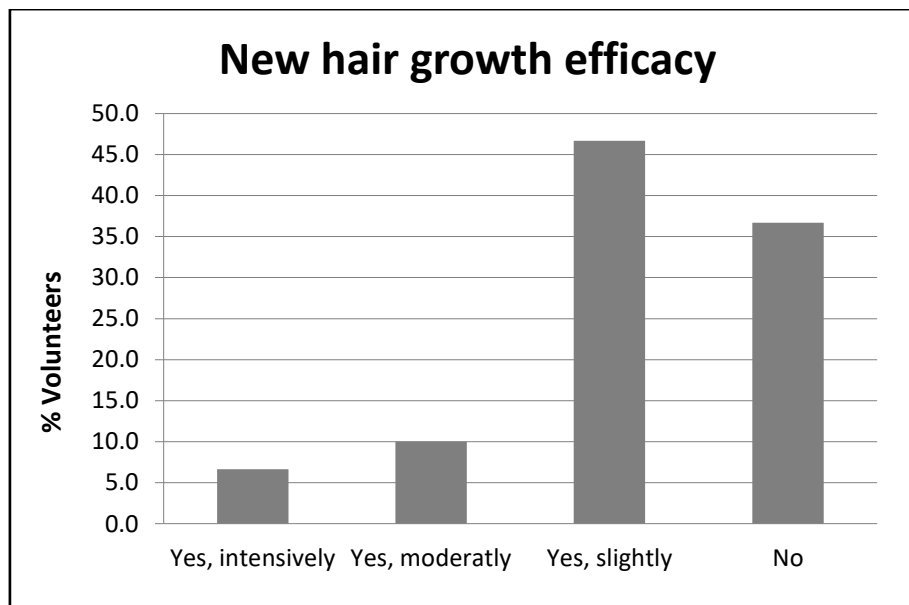


Figure 18: Subjective assessment of the effect on hair density increase of the product after 45 days of applications (n=30).

After 45 days of product applications, 70.0% of the volunteers thought that the product was effective to make the hair easier to manage.

After 45 days of product applications, 56.7% of the volunteers preferred their hair aestheticism comparing with the beginning of the experiment.

Finally, 46.7% of the volunteers were more confident thanks to the appearance of their hair.

After 45 days of product applications, volunteers were asked if they would buy the product. 56.7% of the volunteers would buy it (Figure 19).

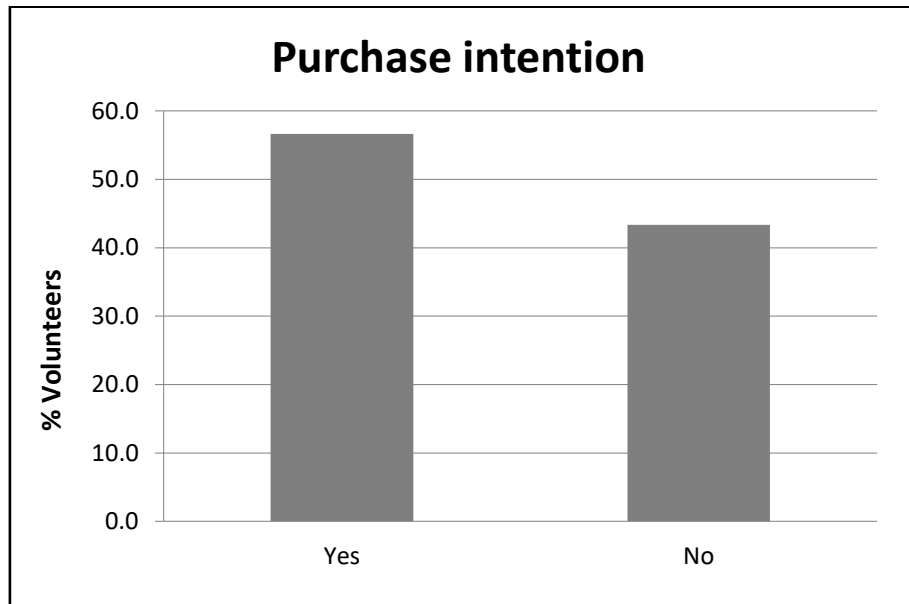


Figure 19: Purchase intention after 45 days of product applications (n=30).

After 45 days of product applications; 23.3% of the volunteers showed itch in the scalp as side effect. This is probably due to intolerance to any component of the formula or to their sensitive scalp. However, the severity of the side effects is described as very mild in a scale between very mild and very severe.

After 150 days of product applications, volunteers were asked about the global appreciation of the product. 73.3% of the volunteers thought it was pleasant (Figure 20).

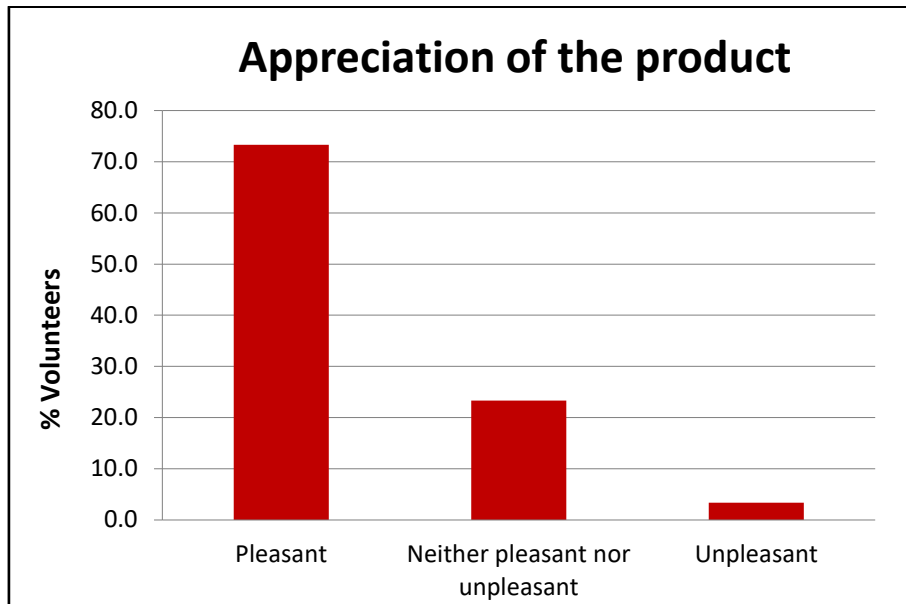


Figure 20: Appreciation of the product after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked about the ease of application of the product. 96.7% of the volunteers thought it was easy.

After 150 days of product applications, volunteers were asked if the product penetrated easily and quickly to the scalp. 93.3% of the volunteers thought it penetrated easily.

After 150 days of product applications, volunteers were asked if the product get dirty their hair. 76.7% of the volunteers thought it was not the case.

After 150 days of product applications, volunteers were asked if the hair loss was reduced. 96.7% of the volunteers thought that hair loss was reduced (Figure 21).

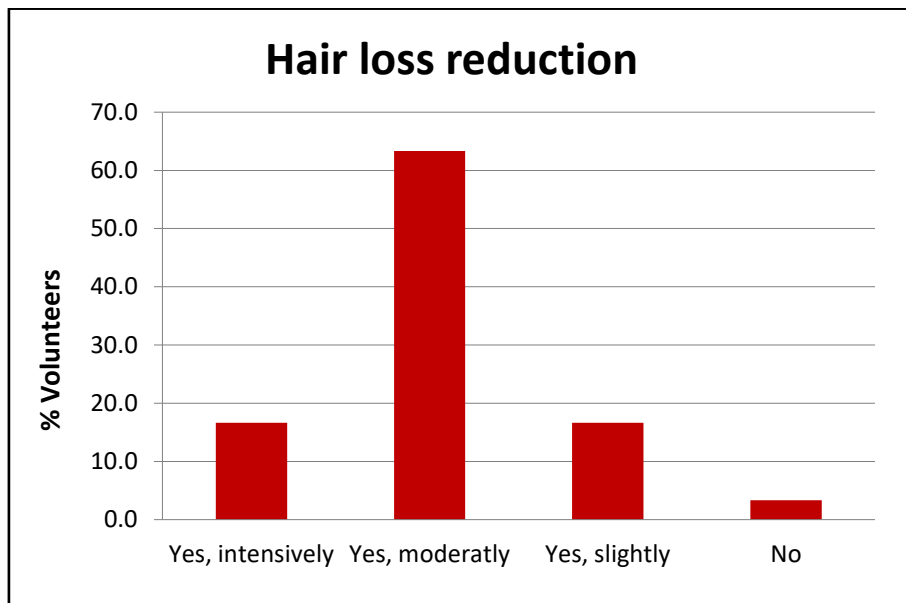


Figure 21: Subjective assessment of the hair loss reduction after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked if the speed of the growth of their hair had increased. 13.3% of the volunteers thought that the increase was intense, 33.63% of the volunteers thought that the increase was moderate.

After 150 days of product applications, volunteers were asked if the hair density enhanced. 10.0% of the volunteers thought that the density enhancing was intense, 30.0% of the volunteers thought that the density enhancing was moderate (Figure 22).

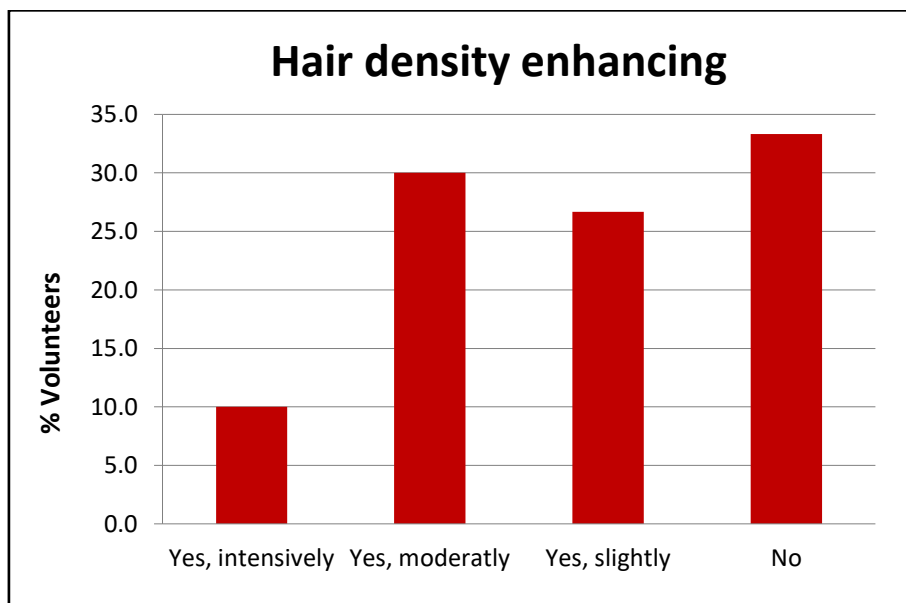


Figure 22: Subjective assessment of the hair density enhancing after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked if they had observed the growth of new hair. 66.7% of the volunteers had observed the growth of new hair.

After 150 days of product applications, volunteers were asked if the number of fallen hair after combing was reduced. 30.0% of the volunteers thought that the reduction was intense, 36.7% of the volunteers thought that the reduction was moderate (Figure 23).

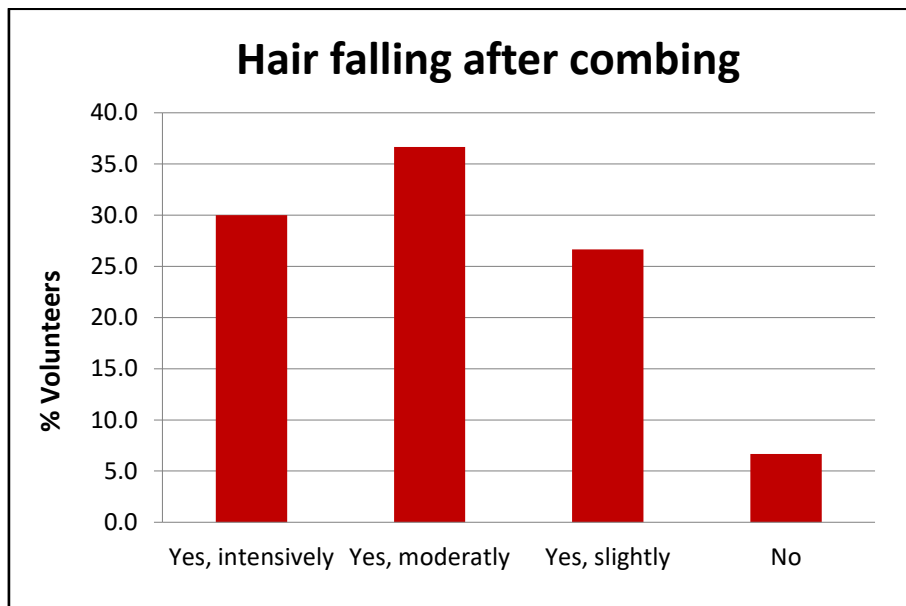


Figure 23: Subjective assessment of the hair fallen reduction after combing after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked if the number of fallen hair after washing was reduced. 23.3% of the volunteers thought that the reduction was intense, 46.7% of the volunteers thought that the reduction was moderate.

After 150 days of product applications, volunteers were asked about if their hair thicker. 6.7% of the volunteers thought it was intensively thicker, 16.7% of the volunteers thought it was moderately thicker.

After 150 days of product applications, volunteers were asked about if their hair was stronger. 10.0% of the volunteers thought it was intensively stronger, 20.0% of the volunteers thought it was moderately stronger (Figure 24).

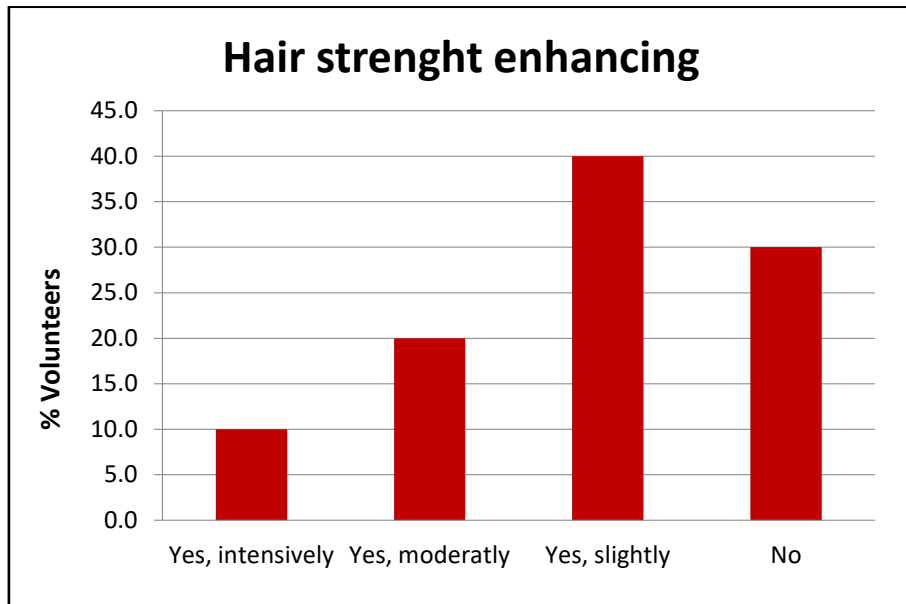


Figure 24: Subjective assessment of the hair strength after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked about if their hair was more vital. 10.0% of the volunteers thought that the vitality increase was intensive, 26.7% of the volunteers thought that the vitality increase was moderate.

After 150 days of product applications, volunteers were asked about if their hair was more luminous. 13.3% of the volunteers thought that the increase of shine was intensive, 23.3% of the volunteers thought that the increase of shine was moderate (Figure 25).

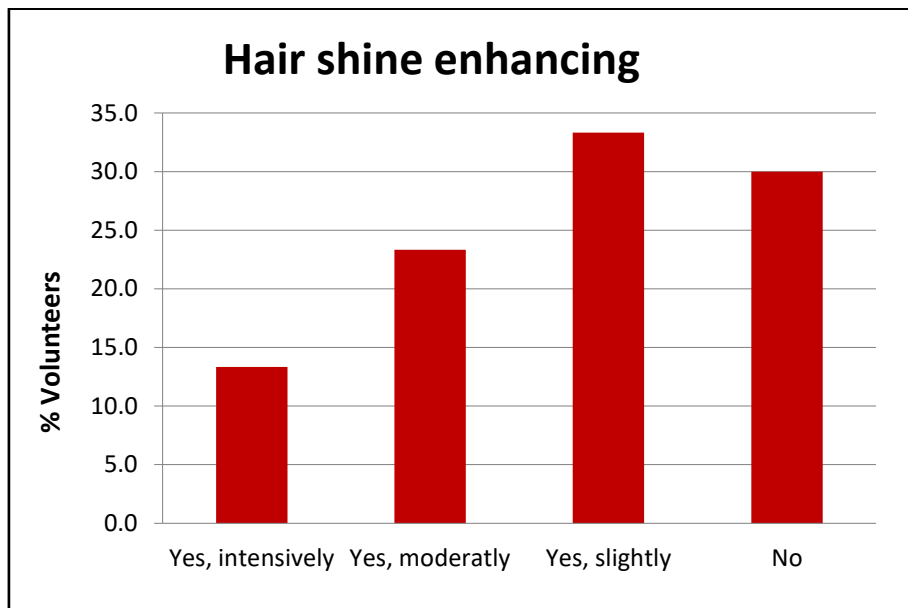


Figure 25: Subjective assessment of the hair shine increase after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked about if they felt a warming sensation after product application. 20.0% of the volunteers described this feeling as intense and 23.3% of the volunteers described this feeling as moderate.

After 150 days of product applications, volunteers were asked about if their hair was more voluminous. 10.0% of the volunteers thought that the increase in volume was intensive, 26.7% of the volunteers thought that the increase in volume was moderate.

After 150 days of product applications, volunteers were asked about if their hair was less frizzy. 5.3% of the volunteers thought that the reduction was important, 31.6% of the volunteers thought that the reduction was moderate. (Figure 26).

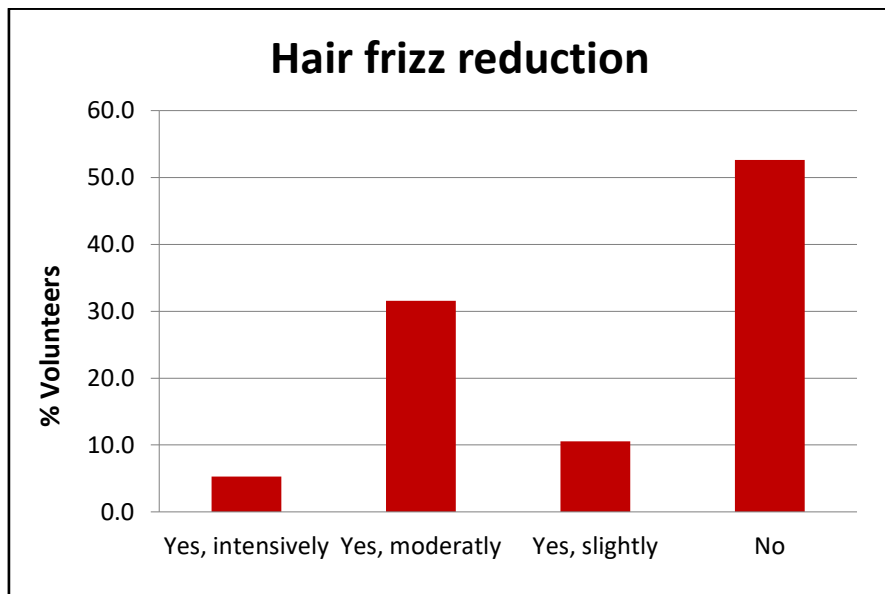


Figure 26: Subjective assessment of the frizz reduction after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked about if their hair was less tangled. 4.5% of the volunteers thought that the reduction was intense, 27.3% of the volunteers thought that the reduction was moderate.

After 150 days of product applications, volunteers were asked about if their hair was better hydrated. 3.3% of the volunteers thought that the enhanced in hydration was intense and 30.0% of the volunteers thought that the enhanced in hydration was moderate (Figure 26).

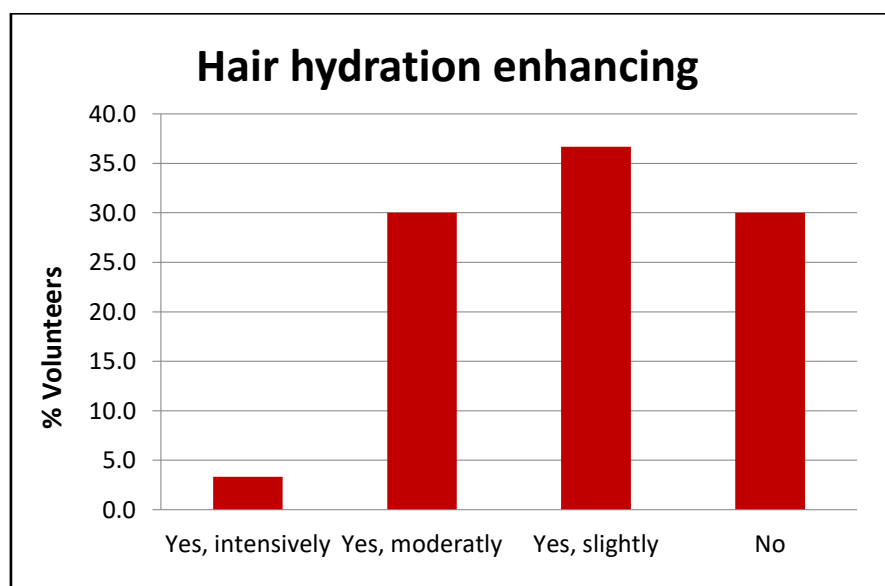


Figure 26: Subjective assessment of the hydration enhanced after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked about if their hair was less damaged. 5.3% of the volunteers thought that the reduction was intense and 26.3% of the volunteers thought that the reduction was moderate.

After 150 days of product applications, volunteers were asked about if the oily aspect of scalp was reduced. 7.1% of the volunteers thought that the reduction was important, 14.3% of the volunteers thought that the reduction was moderate (Figure 27).

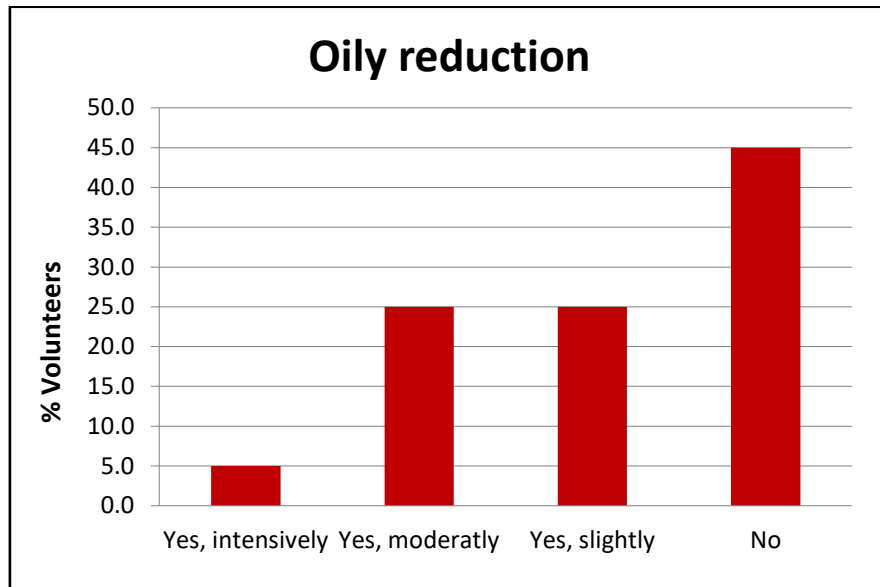


Figure 27: Subjective assessment of the scalp oily aspect reduction after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked about if the level of dandruff was reduced. 7.1% of the volunteers thought that the reduction was important and 14.3% of the volunteers thought that the reduction was moderate.

After 150 days of product applications, volunteers were asked about if the itch in the scalp was reduced. 15.8% of the volunteers thought that the reduction was intense and 36.8% of the volunteers thought that the reduction was moderate (Figure 28).

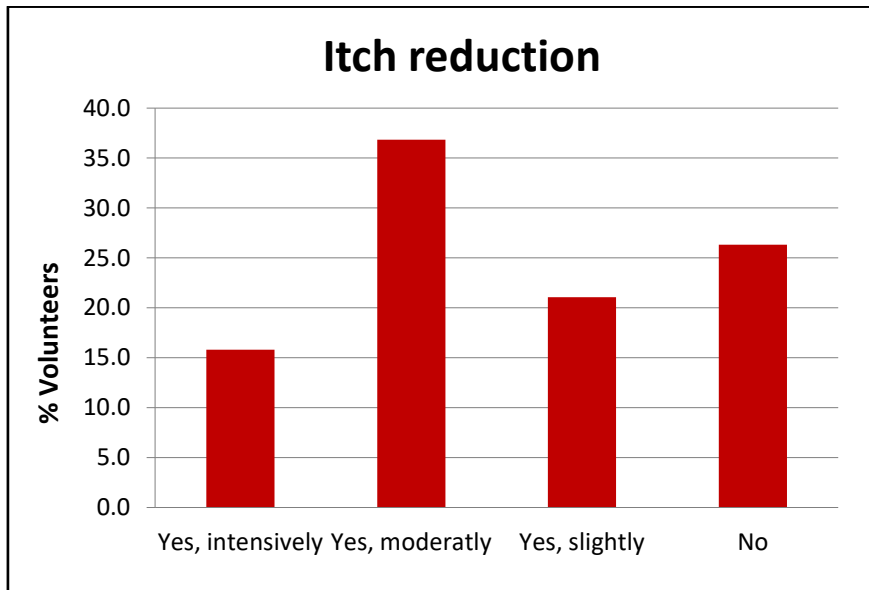


Figure 28: Subjective assessment of the itch reduction after 150 days of applications (n=30)

93.3% of the volunteers are satisfied with the tested product (Figure 29).

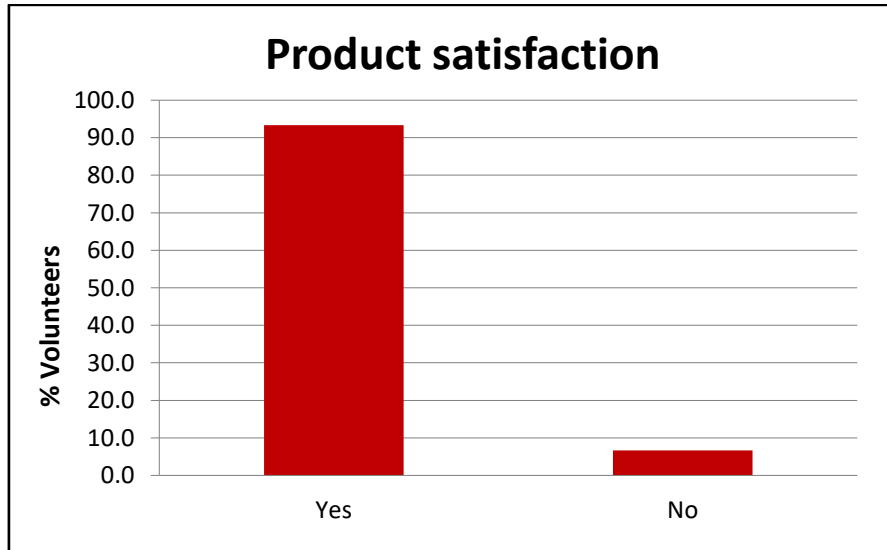


Figure 29: Product satisfaction after 150 days of applications (n=30).

After 150 days of product applications, volunteers were asked about if the lotion had an anti-hair loss effect. 20.0% of the volunteers thought that this effect was important and 33.3% of the volunteers thought that this effect was moderate.

After 150 days of product applications, volunteers were asked about if the lotion did hair growth faster. 10.0% of the volunteers thought that this effect was intense, 26.7% of the volunteers thought that that this effect was moderate.

After 150 days of product applications, volunteers were asked about if the lotion was effective to increase the hair density. 10.0% of the volunteers thought that this effect was intense, 26.7% of the volunteers thought that that this effect was moderate (Figure 30).

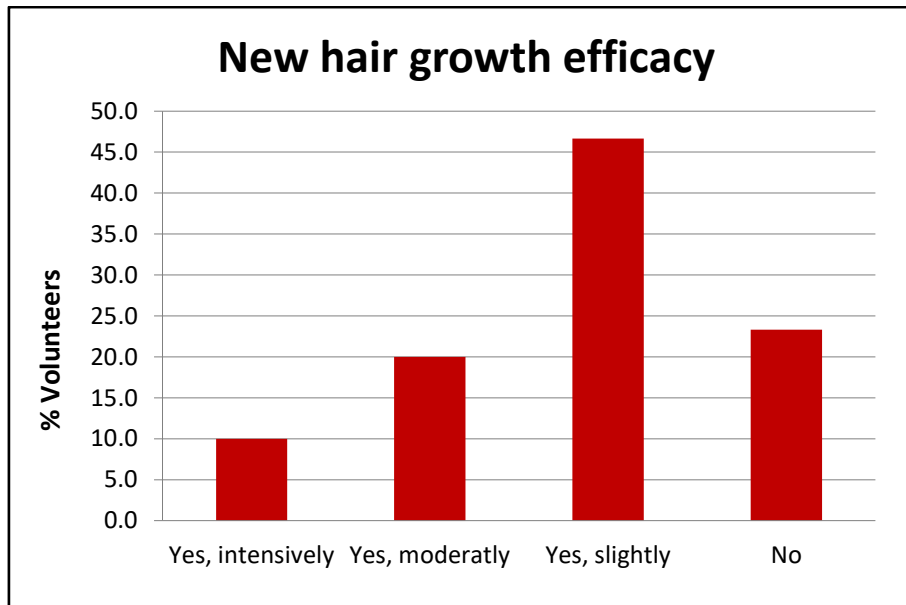


Figure 30: Subjective assessment of the effect on hair density increase of the product after 150 days of applications (n=30).

After 150 days of product applications, 70.0% of the volunteers thought that the product was effective to make the hair easier to manage.

After 150 days of product applications, 63.3% of the volunteers prefer their hair aestheticism comparing with the beginning of the experiment.

Finally, 50.0% of the volunteers were more confident thanks to the appearance of their hair.

After 150 days of product applications, volunteers were asked if they would buy the product. 76.7% of the volunteers would buy it (Figure 31).

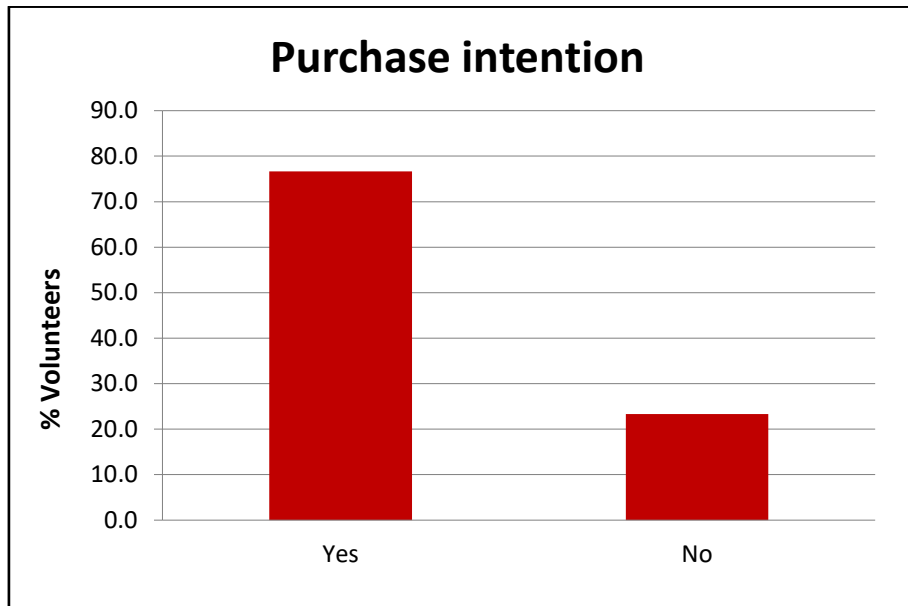


Figure 31: Purchase intention after 150 days of product applications (n=30).

After 150 days of product applications; only 3.3 % of the volunteers show side effect in the scalp. This is probably due to intolerance to any component of the formula or to or to their sensitive scalp. However, the severity of the side effects is described as very mild in a scale between very mild and very severe.

IV. CONCLUSIONS

GENERAL PHOTOGRAPHS

- ❖ In general, differences are observed between the times studied.

HAIR DENSITY

- ❖ **5709 new hairs after 150 days of treatment**
- ❖ After 150 days of applications, 73.3% of the volunteers involved in the study have a higher hair density.
- ❖ At T₁₅₀, the tested product is able to increase the hair density an average value of 5.28%
- ❖ Taking into account only the volunteers with higher capillary density at T₁₅₀, we can say that the tested product is able to increase the capillary density an average value of 8.64%.
- ❖ The statistical results are:

Capillary density (1/cm ²)		
	T ₀	T ₁₅₀
Average	173.31	182.83
Standard deviation	38.37	44.86
Minimum	103.04	101.35
Maximum	261.82	293.92
% of variation absolute respect to T ₀	-	5%
% of panelists with improvement	-	73%
LINEAR MIXED-EFFECTS MODEL		
Predicted average	173.86	181.53
Standard error	7.57	2.29
t value	-	3.36
p value	-	2.22E-03
Significance	-	S

INCREASE OF ANAGEN PHASE (ΔFA) AND REDUCTION OF TELOGEN PHASE (ΔFT)

- ❖ It is observed that the tested product causes a positive effect in 90.0% of volunteers in the anagen phases (increasing). 86.6% of volunteers show a positive effect in the telogen phases (reduction).
- ❖ The average values of the increase and/or decrease of anagenous and/or telogenous phases were 17.5% (increase of anagenous phases) and 36.5% (reduction in telogenous phases).
- ❖ Taking into account only the volunteers with anagen phases increasing or telogen phases reduction, Calculating the average values (taking into account only the volunteers with anagen phases increasing or telogen phases reduction (positive effect)) we obtain 20.03% increase in the case of the anagen phases and a 43.67% decrease in the case of the telegonous phases
- ❖ The statistical results are:

Increase in anagen phase		
	T ₀	T ₁₅₀
Average	0.72	0.83
Standard deviation	0.09	0.06
Minimum	0.48	0.69
Maximum	0.80	0.97
% of variation absolute respect to T₀	-	16%
% of panelists with improvement	-	90%
LINEAR MIXED-EFFECTS MODEL (T ₁₅₀ Vs T ₀)		
Predicted average	0.72	0.84
Standard error	0.02	0.02
t value	-	7.18
p value	-	6.57E-08
Significance	-	S

Increase in telogen phase		
	T₀	T₁₅₀
Average	0.23	0.14
Standard deviation	0.05	0.05
Minimum	0.17	0.03
Maximum	0.41	0.23
% of variation absolute respect to T₀	-	-39%
% of panelists with improvement	-	87%
WILCOXON SIGNED RANK TEST (T₁₅₀ Vs T₀)		
V	-	423.00
p value	-	9.30E-06
Significance	-	S

PERCENTAGE BETWEEN HAIRS IN THE ANAGEN AND THE TELOGEN PHASE

- ❖ The tested product causes a positive effect in 90.0% of volunteers increasing the anagen/telogen ratio after 150 days of treatment.
- ❖ The statistical results are:

Relation - (Anagen/Telogen)_i		
	T₀	T₁₅₀
Average	3.23	7.60
Standard deviation	0.70	6.09
Minimum	1.20	3.00
Maximum	4.00	35.00
% of variation absolute respect to T₀	-	135%
% of panelists with improvement	-	90%
WILCOXON SIGNED RANK TEST (T₁₅₀ Vs T₀)		
V	-	9.50
p value	-	4.71E-06
Significance	-	S

HAIR ROOTS' PHOTOGRAPHS

❖ Volunteer 11:

Before product application, a poorly developed root is observed with a low cellular activity. It corresponds with a clear telogen phase.

In contrast, after 150 days of product application, we can see a root with a presence of hair sheaths with good cellular activity, which correspond to an anagen hair.

❖ Volunteer 27:

As volunteer 3, at the beginning of the experiment, an irregular root is observed, without the presence of hair sheaths. It corresponds with a clear telogen phase.

At the end of the experiment, the root has increased in thickness with respect to T_0 and has well-developed sheaths with good adherence to the follicle.

❖ Volunteer 30:

At the beginning of the experiments, an irregular root is observed, without the presence of hair sheaths. It is poorly developed with poorly compacted and cohesive keratins.

At the end of the experiment, the root has increased in thickness with respect to T_0 and has well-developed sheaths with good adherence to the follicle.

WASH AND COMBING TESTS

- ❖ **10200 hairs saved after 45 days of treatment (considering the hair loss at the beginning of the experiment constant in the 150 days of the experiment)**
- ❖ **29550 hairs saved after 150 days of treatment (considering the hair loss at the beginning of the experiment constant in the 150 days of the experiment)**
- ❖ After 45 days of treatment we can observe that 80.0% of the volunteers have a reduction in hair loss. This reduction has an average value of 13.86%.
- ❖ Taking into account only the volunteers with reduction in hair loss, this reduction has an average value of 28.01%
- ❖ After 150 days of treatment we can observe that 93.3% of the volunteers have a reduction in hair loss. This reduction has an average value of 45.75%.
- ❖ Taking into account only the volunteers with reduction in hair loss, this reduction has an average value of 52.88%
- ❖ The statistical results are:

Combing + Wash test		
	T ₀	T ₄₅
Average	394.63	327.07
Standard deviation	192.88	200.62
Minimum	102.00	68.00
Maximum	795.00	1032.00
% of variation absolute respect to T0	-	-17%
% of panelists with improvement	-	80%
WILCOXON SIGNED RANK TEST (T ₀ VS T ₄₅)		
V	-	351.50
p value	-	0.01
Significance	-	S

Combing + Wash test		
	T ₀	T ₁₅₀
Average	394.63	197.90
Standard deviation	192.88	132.96
Minimum	102.00	60.00
Maximum	795.00	517.00
% of variation absolute respect to T0	-	-50%
% of panelists with improvement	-	93%
LINEAR MIXED-EFFECTS MODEL (T ₀ VS T ₁₅₀)		
Predicted average	372.76	185.06
Standard error	30.09	29.85
t value	-	-6.29
p value	-	7.26E-07
Significance	-	S

VOLUNTEERS' SURVEYS

- ❖ The global appreciation of the product was:
 - After 45 days of product applications, 56.7% of the volunteers thought it was pleasant.
 - After 150 days of product applications. 73.3% of the volunteers thought it was pleasant.

- ❖ The ease of application of the product was:
 - After 45 days of product applications, 96.7% of the volunteers thought it was easy.
 - After 150 days of product applications, 96.7% of the volunteers thought it was easy.

- ❖ The ease of penetration to the scalp of the product was:
 - After 45 days of product applications, 100.0% of the volunteers thought it penetrated easily.
 - After 150 days of product applications, 93.3% of the volunteers thought it penetrated easily.

- ❖ The dirty hair left by the product was:
 - After 45 days of product applications, 66.7% of the volunteers thought it was not the case.
 - After 150 days of product applications, 76.7% of the volunteers thought it was not the case.

- ❖ The reduction in hair loss was:
 - After 45 days of product applications, 76.7% of the volunteers thought that hair loss was reduced.
 - After 150 days of product applications, 96.7% of the volunteers thought that hair loss was reduced.

- ❖ The increase in hair growth speed was:
 - After 45 days of product applications, 3.3% of the volunteers thought that the increase was intense, 16.7% of the volunteers thought that the increase was moderate.
 - After 150 days of product applications, 13.3% of the volunteers thought that the increase was intense, 33.63% of the volunteers thought that the increase was moderate.

- ❖ The enhancing in hair density was:
 - After 45 days of product applications, 3.3% of the volunteers thought that the density enhancing was intense, 13.3% of the volunteers thought that the enhancing was moderate.
 - After 150 days of product applications, 10.0% of the volunteers thought that the enhancing was intense, 30.0% of the volunteers thought that the enhancing was moderate.

- ❖ The appearance of new hair was:
 - After 45 days of product applications, 36.7% of the volunteers had observed the growth of new hair.
 - After 150 days of product applications, 66.7% of the volunteers had observed the growth of new hair.

- ❖ The reduction of the number of fallen hair after combing was:
 - After 45 days of product applications, 3.3% of the volunteers thought that the reduction was intense, 23.3% of the volunteers thought that the reduction was moderate.
 - After 150 days of product applications, 30.0% of the volunteers thought that the reduction was intense, 36.7% of the volunteers thought that the reduction was moderate.

- ❖ The reduction of the number of fallen hair after washing was:
 - After 45 days of product applications, 3.3% of the volunteers thought that the reduction was intense, 26.7% of the volunteers thought that the reduction was moderate.
 - After 150 days of product applications, 23.3% of the volunteers thought that the reduction was intense, 46.7% of the volunteers thought that the reduction was moderate.

- ❖ The thick of the hair was:
 - After 45 days of product applications, 16.7% of the volunteers thought it was moderately thicker.
 - After 150 days of product applications, 6.7% of the volunteers thought it was intensively thicker, 16.7% of the volunteers thought it was moderately thicker.

- ❖ The strength of the hair was:

- After 45 days of product applications, 16.7% of the volunteers thought it was moderately stronger.
- After 150 days of product applications, 10.0% of the volunteers thought it was intensively stronger, 20.0% of the volunteers thought it was moderately stronger.

- ❖ The vitality increase of hair was:
 - After 45 days of product applications, 23.3% of the volunteers thought that the vitality increase was moderate.
 - After 150 days of product applications, 10.0% of the volunteers thought that the vitality increase was intensive, 26.7% of the volunteers thought that the vitality increase was moderate.

- ❖ The hair shine increase was:
 - After 45 days of product applications, 13.3% of the volunteers thought that the increase of shine was moderate.
 - After 150 days of product applications, 13.3% of the volunteers thought that the increase of shine was intensive, 23.3% of the volunteers thought that the increase of shine was moderate.

- ❖ The warming sensation
 - After 45 days of product applications, 20.0% of the volunteers described this feeling as intense and 33.3% of the volunteers described this feeling as moderate.
 - After 150 days of product applications, 20.0% of the volunteers described this feeling as intense and 23.3% of the volunteers described this feeling as moderate.

- ❖ The hair volume increase was:
 - After 45 days of product applications, 20.0% of the volunteers thought that the increase in volume was moderate.
 - After 150 days of product applications, 10.0% of the volunteers thought that the increase in volume was intensive, 26.7% of the volunteers thought that the increase in volume was moderate.

- ❖ The decrease in frizz hair was:
 - After 45 days of product applications, 22.2% of the volunteers thought that the reduction was moderate.
 - After 150 days of product applications, 5.3% of the volunteers thought that the reduction was important, 31.6% of the volunteers thought that the reduction was moderate.

- ❖ The enhancing in hair hydration was:
 - After 45 days of product applications, 6.7% of the volunteers thought that the enhancing in hydration was intense and 16.7% of the volunteers thought that it was moderate.
 - After 150 days of product applications, 3.3% of the volunteers thought that the enhancing in hydration was intense and 30.0% of the volunteers thought that the enhancing in hydration was moderate.

- ❖ The reduction of damaged hair was:
 - After 45 days of product applications, 4.8% of the volunteers thought that the reduction was intense and 19.0% of the volunteers thought that the reduction was moderate.
 - After 150 days of product applications, 5.3% of the volunteers thought that the reduction was intense and 26.3% of the volunteers thought that the reduction was moderate.

- ❖ The reduction in oily aspect of scalp was:
 - After 45 days of product applications, 21.1% of the volunteers thought that the reduction was moderate.
 - After 150 days of product applications, 7.1% of the volunteers thought that the reduction was important, 14.3% of the volunteers thought that the reduction was moderate.

- ❖ The reduction of dandruff was:
 - After 45 days of product applications, 7.7% of the volunteers thought that the reduction was moderate.
 - After 150 days of product applications, 7.1% of the volunteers thought that the reduction was important and 14.3% of the volunteers thought that the reduction was moderate.

- ❖ The reduction in itch was:
 - After 45 days of product applications, 10.5% of the volunteers thought that the reduction was intense and 10.5% of the volunteers thought that the reduction was moderate.
 - After 150 days of product applications, 15.8% of the volunteers thought that the reduction was intense and 36.8% of the volunteers thought that the reduction was moderate.

- ❖ The satisfaction with the product was:

- After 45 days of product applications 63.3% of the volunteers were satisfied with the tested product.
- After 150 days of product applications 93.3% of the volunteers were satisfied with the tested product.

- ❖ The anti-hair loss effect of the product was:
 - After 45 days of product applications, 36.7% of the volunteers thought that this effect was moderate.
 - After 150 days of product applications, 20.0% of the volunteers thought that this effect was important and 33.3% of the volunteers thought that this effect was moderate.

- ❖ The hair growth effect of the product was:
 - After 45 days of product applications, 6.7% of the volunteers thought that this effect was intense, 10.0% of the volunteers thought that that this effect was moderate.
 - After 150 days of product applications, 10.0% of the volunteers thought that this effect was intense, 26.7% of the volunteers thought that that this effect was moderate.

- ❖ The increased hair density due to the product application was:
 - After 45 days of product applications, 6.7% of the volunteers thought that this effect was intense, 10.0% of the volunteers thought that that this effect was moderate.
 - After 150 days of product applications, 10.0% of the volunteers thought that this effect was intense, 26.7% of the volunteers thought that that this effect was moderate.

- ❖ The increased manageability of hair due to the product application was:
 - After 45 days of product applications, 70.0% of the volunteers thought that the product was effective to make the hair easier to manage.
 - After 150 days of product applications, 70.0% of the volunteers thought that the product was effective to make the hair easier to manage.

- ❖ The hair aestheticism:
 - After 45 days of product applications, 56.7% of volunteers prefer their hair aestheticism comparing with the beginning of the experiment.
 - After 150 days of product applications, 63.3% of volunteers prefer their hair aestheticism comparing with the beginning of the experiment.

- ❖ Self-confidence:
 - After 45 days of product applications, 46.7% of the volunteers were more confident thanks to the appearance of their hair.
 - After 150 days of product applications, 50.0% of the volunteers were more confident thanks to the appearance of their hair.

- ❖ The purchase intention of the product was:
 - After 45 days of product applications, 56.7% of the volunteers would buy it.
 - After 150 days of product applications, 76.7% of the volunteers would buy it.

V. CERTIFICATE AND SIGNATURE

Efficacy study N°: ID034-21

Done by: Centro de Tecnología Capilar, S.L.

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C.T.C. if not responsible for statements or conclusions that are not strictly those indicated in the present report.

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