

Care  
Creations™

Trichogen™  
Global hair de-ager

Beauty Creations  
*The Passion for Beauty*

 **BASF**  
The Chemical Company

# Trichogen™

## Androgenetic alopecia

Mainly for men but more and more also for women, hair loss or thinning hair represents a major problem.

As it affects the appearance and is perceived to reduce attractiveness as well as the power of seduction, it has a big psychological impact and diminishes self confidence.

Androgenetic alopecia is the most common form of hair loss affecting both men and women. In men, it is also commonly known as male-pattern baldness. Hair is lost in a specific, well-defined pattern, often progressing to partial or complete baldness. In women, the hairline does not recede, but the hair becomes thinner all over the head.

Three main factors play a role in androgenetic alopecia:

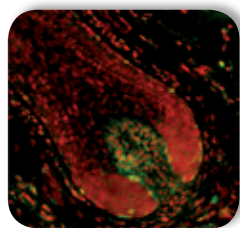
- modifications in the receptivity of the hair follicles to male hormones (androgens), which can be genetically inherited or can be related to hormonal changes (postpregnancy or post-menopause) and psychological stress,
- nutritional deficiencies in proteins, sulphur amino acids or vitamins, which can be aggravated in case of insufficient microcirculation,
- seborrhea (greasy scalp and hair), often also linked to dandruff and itching scalp.

## Hair cycle and alopecia

In a normal state hair grows with a periodic circle activity in 3 phases (anagen - telogen - catagen).

85% of the total hair is in the anagen state. In normal conditions every day between 50 and 100 hair in telogen phase naturally fall out.

The anagen/telogen ratio characterizes the evolution of hair life cycle and it is detected by means of a trichogram: 20 to 30 hair are collected from the three areas of the scalp (frontal, parietal and occipital) and the anagen/telogen hair ratio is determined. When the A/T ratio is below 4, the volunteer is classified as having alopecia.



Trichogen™ VEG has been specifically developed to help persons suffering from abnormal hair loss to recover a normal rate of hair loss as well as stimulate healthy hair and scalp.

## Definition / Composition

Trichogen™ VEG is a powerful association of selected components used in Traditional Chinese Medicine with some amino acids and vitamins, which allows the natural hair cycle to regain a normal state (measured by the ratio between anagen «alive» versus telogen «resting» hair bulbs).

Main components:

1. Sulfopeptides of soy (Glycine max) (MW ~ 15,000 Da). Regulators of cell nutrition and growth, supply of bio-available sulfur, stimulation of protein biosynthesis.
2. Amino-acids: derivatives of tyrosine, arginine, ornithine, citrulline: precursors of proteins and pigments.
3. Aminosaccharide: glucosamine. GAG precursor for strengthening the extracellular papillary/peribulbar matrix.
4. Vitamins of B group (PP, B5 and Biotin) take part in the regulation of cellular nutrition and lipogenesis: fight against any deficiency in B vitamins and oligo-elements.
5. Zinc salt: regulation of sebum production.
6. Panax ginseng and Arctium majus extracts: toning (local microcirculation) and antimicrobial effects.
7. Silicone, quaternary polymer and hydrolyzed soy proteins: hair conditioners.

## Hair and scalp benefits

1. Decrease of hair loss and stimulation of hair growth, stimulation of metabolism, improvement of cellular oxygenation and skin/scalp microcirculation.
2. Improvement of hair aspect and sensorial hair qualities, decrease of oily look, conditioning, repairing, improvement of the dry, dull look, increase of suppleness and easier combing.
3. Improvement of scalp condition, balance of sebum secretion, decrease of dandruff and itching sensations. The scalp is healthier.

## Cosmetics use

- Hair care products to counteract hair-loss disorders.
- Hair strengthening and anti-age formulations.
- Intensive care for damaged hair and sensitive scalp.
- Kits and regimen for intensive, seasonal treatments against hair thinning.

Trichogen™ VEG may be formulated either into leave-on or rinse-off applications.

The recommended anti-hair loss program is a leave-on treatment 3 times a week for at least 3 months, which can be combined with rinse-off products containing Trichogen™ VEG. To achieve optimal results continued use is recommended.

## Dosage / Solubility / Mode of incorporation

1. **Dose of use:** 5 - 10%
2. **Solubility:** soluble in water, in hydroalcoholic solutes and insoluble in oils.
3. **Mode of incorporation:** Trichogen™ VEG is incorporated into cosmetic products at room temperature for gels and tonics, at 50°C, during the finishing process for emulsion

## Analytical characteristics

1. **Aspect:** yellow liquid with a weak characteristic odor.
2. **Specifications:** upon request.

## Tolerance

Good.

## Efficacy

Efficacy tests hereafter.

## Storage

In its original packaging, at 15 - 25°C.

## INCI name

Trichogen™ LS 9922

Water (and) Panax Ginseng Root Extract (and) Arginine (and) Acetyl Tyrosine (and) Arctium Majus Root Extract (and) Hydrolyzed Soy Protein (and) Polyquaternium-11 (and) PEG-12 Dimethicone (and) Calcium Pantothenate (and) Zinc Gluconate (and) Niacinamide (and) Ornithine HCl (and) Citrulline (and) Glucosamine HCl (and) Biotin

Preservative: phenoxyethanol

## Efficacy tests

First of all, the effects and the mechanism of action of Trichogen™ VEG via multiple complementary pathways were checked *in vitro*:

- stimulation of oxygen consumption (epithelial cells),
- substantivity effect on hair tress (fluorescamine reaction),
- conditioning and repairing on dry hair (SEM: scanning electron microscopy),
- photo-protection on hair tress (dansyl chloride test),
- strengthening on hair (traction test).

## Stimulation of oxygen consumption (*in vitro* test on epithelial cells)

### Aim

To demonstrate the capacity of Trichogen™ VEG to stimulate cell metabolism and cell vitality.

### Method

Polarographical measurements of oxygen consumption on homogenate of epithelial cells in the presence of Trichogen™ VEG at different concentrations.

### Results

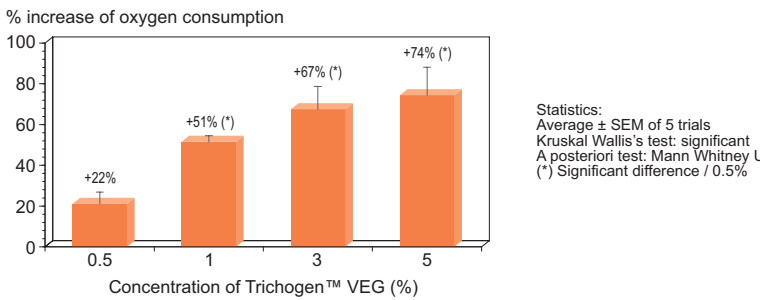


Fig. 1 - Increase of oxygen consumption on epithelial cells.

### Conclusion

A significant and dose-dependent increase of oxygen consumption by epithelial cells has been demonstrated, representative of an increase in cell metabolism/vitality.

Trichogen™ VEG clearly improves cell vitality.

# Substantive effect on human hair (fluorescamine reaction)

## Aim

To demonstrate the capacity of Trichogen™ VEG to adsorb to hair keratin. The linkage to keratin should resist to standard rinse.

## Method

The quantity of product adsorbed on hair is evaluated by reaction with fluorescamine after extraction in 2 different conditions: high temperature (50°C), and high ionic force (0.5 M NaCl).

## Protocol

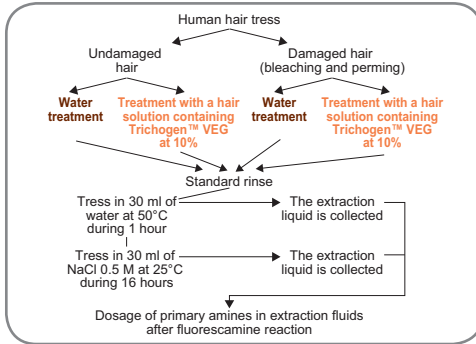


Fig. 2 - Protocol of evaluation of the substantivity on human hair.

## Results

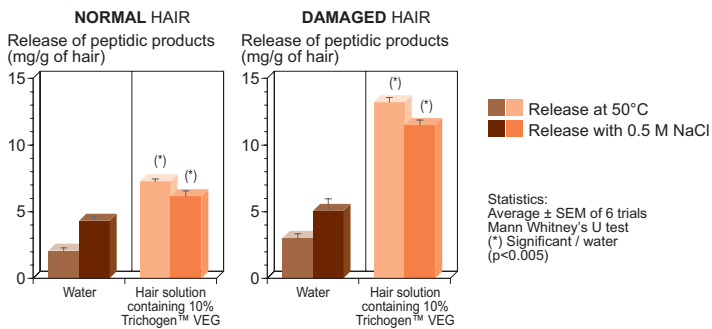


Fig. 3 - Release of peptic products from hair treated or not (normal and damaged).

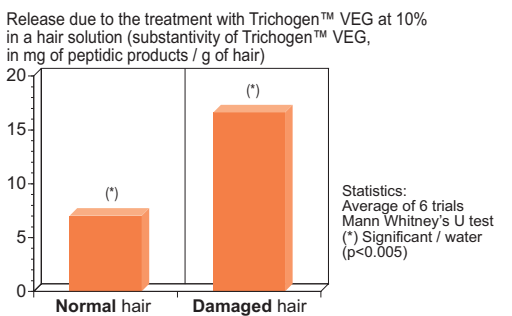


Fig. 4 - Release of peptic products due to the treatment.

## Conclusion

The substantivity of Trichogen™ VEG at 10% in a hair solution has been demonstrated by the adsorption of 7 mg of Trichogen™ VEG per g of normal hair and 16.6 mg of Trichogen™ VEG per g of damaged hair.

# Conditioning and repairing effect on human hair (SEM)

## Aim

To demonstrate the capacity of Trichogen™ VEG to improve the aspect of human dry hair by scanning electron microscopy (SEM) observation.

## Protocol

Dry hair was obtained by an acetone/ether mixture (1:1).

Hair being thus damaged was then treated with Trichogen™ VEG at 10% in a hair solution.

## Results

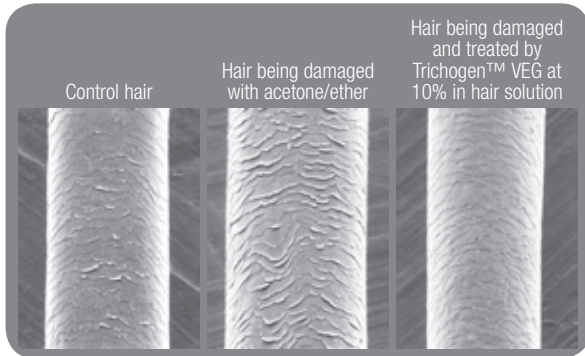


Fig. 5 - SEM observation (x 400).

## Conclusion

Trichogen™ VEG at 10% in a hair solution has clearly improved the surface of hair, and has shown a good hair conditioning / repairing effect.

# Photo-protecting effect on human hair (dansyl chloride test)

## Aim

To demonstrate the photo-protecting activity of Trichogen™ VEG by dansyl chloride method.

## Method

Dansyl chloride can bind to amino acids of the hair keratin. The consequence of this linkage is the formation of fluorescence product. The weathering and the UV irradiation reduce the linkage to amino acids and consequently the fluorescence intensity. The intensity of the fluorescence is a measure of hair damage.

## Protocol

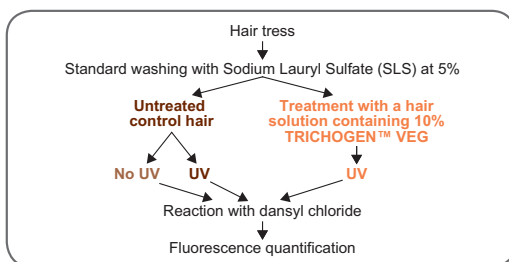


Fig. 6 - Protocol of evaluation of the photo-protection on human hair.

## Results

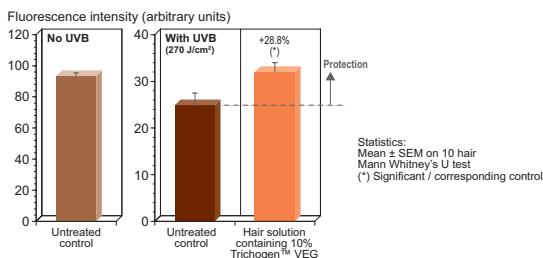


Fig. 7 - Protecting effect against hair damage by UVB.

## Conclusion

The protecting effect of the hair solution containing 10% Trichogen™ VEG was demonstrated by an increase of the fluorescence intensity by 28.8%.

The treatment with the hair solution containing 10% Trichogen™ VEG has protected hair against UVB induced damage.

# Strengthening effect on human hair (traction test)

## Aim

To demonstrate the strengthening activity of Trichogen™ VEG by a tensile test.

## Protocol

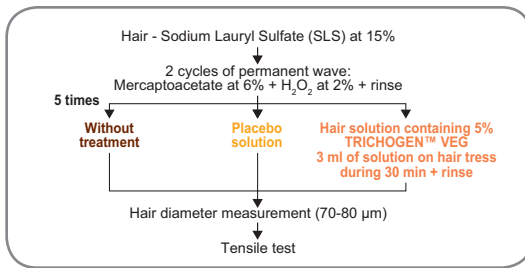


Fig. 8 - Protocol of evaluation of the strengthening effect on human hair.

## Results

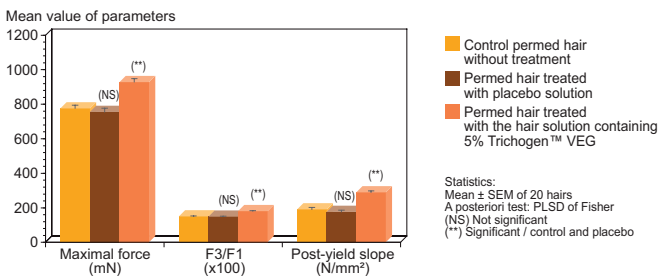


Fig. 9 - Strengthening effect against hair damaged by permanent wave.

## Conclusion

The strengthening activity of Trichogen™ VEG at 5% in a hair solution on damaged hair is clearly demonstrated: the increase of hair mechanical parameters linked to the hair strength is significant.

# Anti-hair loss activity (clinical study)

## Aim

To demonstrate in vivo on volunteers the anti-hair loss activity and the improvement of the hair appearance and sensorial qualities, of a hair solution containing 10% Trichogen™ VEG.

## Protocol

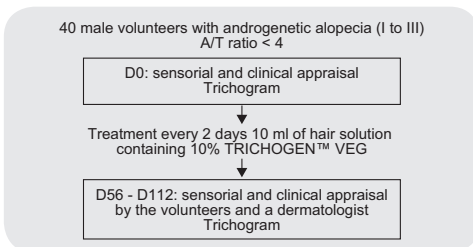


Fig. 10 - Protocol of the clinical evaluation of anti-hair loss activity.

The study has been carried out on 40 male volunteers having an androgenetic alopecia (type I to III). The selected volunteers had the average A/T ratio (on 3 areas of scalp) lower than 4. All the volunteers were in a phase of hair loss.

Treatment every 2 days, on the scalp and on the clean, dry hair, during 16 weeks.

Evaluation of the efficacy of the treatment was done after 8 and 16 weeks of treatment (D56 and D112).

## Sensorial evaluation

After 8 and 16 weeks of treatment, appraisal by volunteers of:

- the intensity of hair loss in 3 usual situations (combing, shampoo, on the pillow),
- the efficacy of the solution on the appearance and sensorial qualities of hair and scalp, with a questionnaire of sensorial evaluation.

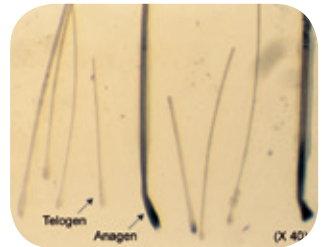
## Clinical evaluation

Interview and examination of the volunteers by a dermatologist:

- importance of hair loss in 3 usual situations: during combing, shampoo, and on the pillow,
- hair quality,
- scalp condition,
- hair regrowth.

## Evaluation by trichogram and phototrichogram

A trichogram was made on 3 areas on the scalp (frontal, parietal and occipital); standardized sampling of about 20 to 30 hairs for counting the ratio of anagen hair (A) and telogen ones (T), calculation of the A/T ratio



**Fig. 11** - Presentation of anagen and telogen bulbs obtained on a trichogram of the alopecic volunteer. Telogen hair is prevailing.

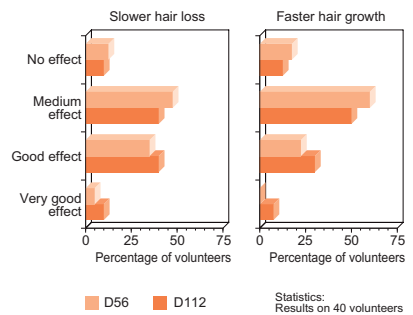
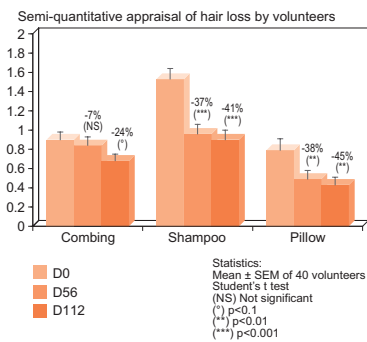
## Results

A treatment for 16 weeks with a hair solution containing 10% Trichogen™ VEG gave the following results:

### Sensorial evaluation

Volunteers have observed:

- an improvement of the appearance and sensorial qualities scalp/hair,
- a decrease of hair loss,
- an increase in the speed of hair growth.



**Fig. 12** - Semi-quantitative evaluation by volunteers of the intensity of hair loss, after 8 and 16 weeks of treatment.

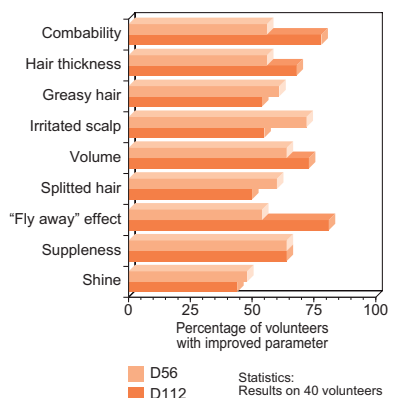
Parameters	Improvement (% volunteers) after			
	56 days		112 days	
	Good	Quite good	Good	Quite good
Body, volume	42.5	5	52.5	10
Vitality	45	7.5	52.5	10
Shine	52.5	5	42.5	12.5
Silky aspect	42.5	2.5	50	12.5
Seborrhea	42.5	6	33	12
Irritation	37	29.5	48.5	13

**Fig. 13** - Sensorial appraisal (40 volunteers) after 8 and 16 weeks of treatment: anti-hair loss activity, appearance and sensorial qualities of hair and scalp.

### Clinical evaluation

The dermatologist has observed:

- a decrease of hair loss,
- an improvement of the aesthetic and sensorial qualities of hair, along with the scalp condition,
- a «regrowth effect» among 36% of the volunteers, after 16 weeks of treatment.



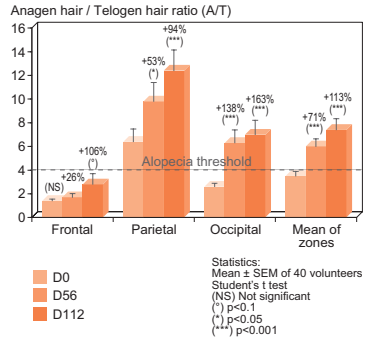
**Fig. 14** - Evaluation of aesthetic and sensorial qualities of hair and scalp by the dermatologist.



## Evaluation by trichogram

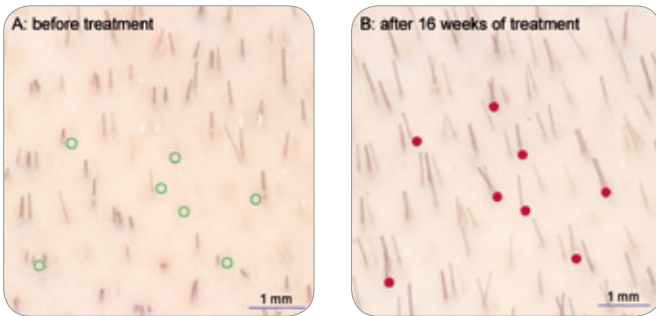
The treatment with Trichogen™ VEG at 10% in a hair solution has:

- significantly decreased hair loss; on average, on the 3 tested areas of the scalp, the A/T ratio has increased by more than 100% and has moved from 3.47 (alopecia) up to 7.4 (normalization),
- revitalized hair in the parietal area by strengthening significantly the A/T ratio within the area where the loss usually is gentler,
- gradually reversed the dramatic process of hair loss within the frontal area; there, the A/T ratio has increased by more than 100%,
- decreased and significantly reversed the hair loss process within the occipital area; most significant results.



**Fig. 15** - Evaluation of the A/T ratio obtained by trichogram on 3 areas of the scalp before (D0) then after 8 (D56) and 16 weeks (D112) of treatment.

## Evaluation by phototrichogram



**Fig. 16** - Visualization by phototrichogram, of the regrowth effect on 1 volunteer, after 16 weeks of treatment.

A: visualization of a scalp area before treatment.

B: same area after 16 weeks of treatment: new hair comes out ○ compared to before treatment ● each one in anagen phase.

## Conclusion

With Trichogen™ VEG hair and scalp recover a visible second youth.

Hair life cycle is normalized leading to a reduction of hair loss, a stimulation of hair regrowth. Hair appearance and sensorial properties are improved, scalp is healthier.

Trichogen™ VEG constitutes a global treatment as alternative to hair restoration procedures.

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