



Biotinyl-GHK, citrus and olive tree leaves

#### Function:

Fights follicle ageing process to prevent hair loss.

#### Definition:

Combination of a vitaminated matrikine (biotinyl-GHK) with apigenin (a flavonoid from citrus) and oleanolic acid from olive tree leaves.

#### Properties:

PROCAPIL™ targets the main causes of alopecia: poor scalp micro-circulation, follicle ageing and follicle atrophy caused by dihydrotestosterone.

#### Characteristics:

Oleanolic acid inhibits 5 $\alpha$ -reductase, apigenin improves micro-circulation and biotinyl-GHK stimulates cell metabolism.

#### INCI name:

Butylene Glycol – Water (Aqua)  
– PPG-26-Buteth-26 –  
PEG-40 Hydrogenated Castor Oil  
– Apigenin – Oleanolic Acid  
– Biotinoyl Tripeptide-1

#### Applications:

Hair strengthening and anti-hair loss treatments: lotions, conditioners, leave-on products...

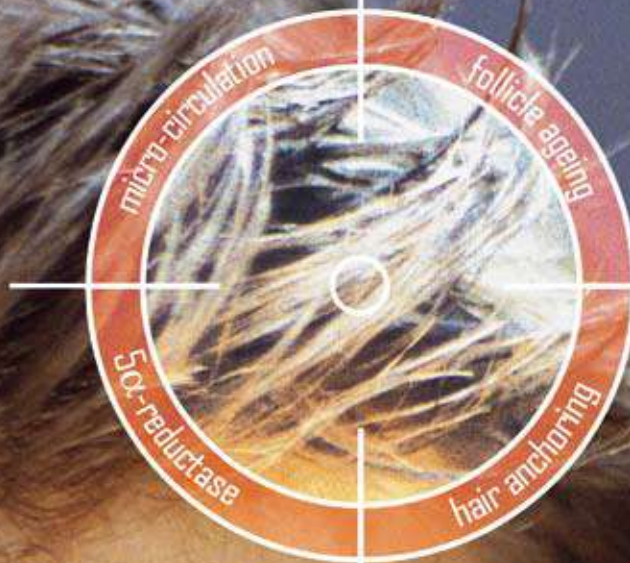
#### Formulation:

Water soluble

#### Recommended use level:

3%

# Don't let your hair down



Fortifies  
Rejuvenates  
Prevents hair loss



## Stimulation of cell metabolism

### Mitosis rate

Evaluation of root sheath keratinocytes after a 14-day culture of hair follicles. Biotinyl-GHK (2 ppm) stimulates Ki-67 expression, indicating enhanced cell proliferation.

### Gene expression

PROCAPIL™ promotes the expression of numerous genes involved in tissue repair mechanisms (DNA-array on 3D SkinEthic® epidermis).

### Hair anchoring

Hair follicles are incubated for 14 days with biotinyl-GHK (2 ppm).

Morphological observation of the dermis/root sheath junction.

The persisting dermis/root sheath junction is thick and recovers its normal sinusoidal shape.

Laminin 5 and collagen IV are revealed by immunofluorescence.

**PROCAPIL™ provides a protecting and repairing effect on the structure components of the hair follicle, slowing down the ageing process.**

### Stimulation of hair growth

Hair follicles are incubated for 14 days with biotinyl-GHK or minoxidil (2 ppm).

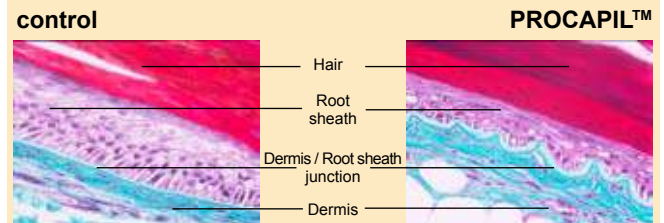
Biotinyl-GHK is as efficient as minoxidil at the same concentration (2 ppm).

## In vitro

### Examples of activated genes by PROCAPIL™

Gene	Activity	Activation
Laminin binding protein	Adhesion	+146%
Acetyl CoA transferase	Cell metabolism	+137%
Cytokeratins 10	Differentiation	+154%

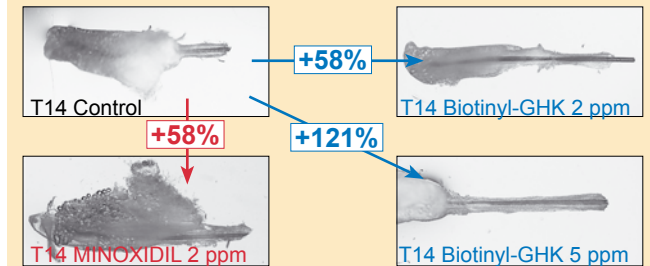
### Morphological observation



### Presence of adhesion molecules

Adhesion molecules	T14 Control	T14 PROCAPIL™
Laminin 5	+	+++
Collagen IV	+	+++

### Hair growth stimulation



## Clinical study

Panel of 35 males with alopecia (Tmean=28%) applied a hair lotion with 3% PROCAPIL™ (18 volunteers) or a placebo (17 volunteers) twice daily for 4 months. The proportion of hair observed in anagen phase (A) and telogen phase (T) was determined and the ratio A/T established. Hair samples were taken and analysed.

### Videotrichogramme

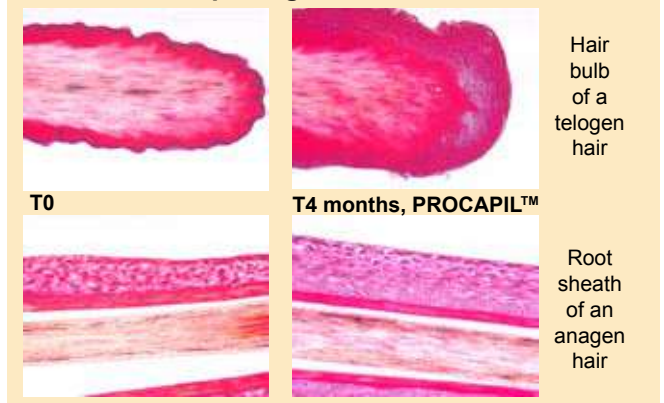
A/T (Mean value)	PROCAPIL™	PLACEBO
T0	2.84	2.61
T4months	<b>3.13</b>	2.54

The A/T ratio increases significantly by up to 46%, compared to T0 and the placebo. With PROCAPIL™, **67% of the volunteers had their anagen hair number increased.**

### Hair follicle morphological study

After treatment, hair bulb cells were found to be highly structured and differentiated. The root sheath was thicker and more able to provide optimum anchoring.

### Morphological observation



**Hair anti-ageing can be promoted by stimulation of follicle cell metabolism, leading to a slow down in hair loss.**

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