Function:
Fights follicle ageing and protects against hair loss.

Definition:
Combination of a vitamin fortified 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:
Biotinyl-GHK stimulates cell metabolism, apigenin improves micro-circulation and oleanolic acid inhibits 5α-reductase.

INCI name:

Applications:
Hair care products: shampoos, conditioners, leave-on, hair lotions, masks...

Formulation:
Water soluble. Incorporate at 45°C in emulsions or at room temperature in gels.

Recommended use level:
1% to 2%
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).

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)
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<tr>
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<th>PROCAPIL™</th>
<th>PLACEBO</th>
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<tbody>
<tr>
<td>T0</td>
<td>2.84</td>
<td>2.61</td>
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<tr>
<td>T4months</td>
<td>3.13</td>
<td>2.54</td>
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  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.

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

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