PENTAVITIN®
Feel deep hydration for 72 hours

April 2013
## Outline

1. Insights into current consumer trends
2. What is special about PENTAVITIN®?
3. PENTAVITIN® for Skin Care
4. PENTAVITIN® for Hair Care
5. Conclusions
Trend: Pure & Elegant Performance
Moods

Water-like surfaces, organic shapes and the importance of light
Trend: Pure & Elegant Performance
Consumers Lifestyle

- **Inspiration:** water
- **Style:** elegant and sophisticated
- Belief in science and wish to solve nature’s mysteries
- „Green“ attitude means: mindful need for change, *combination of nature and science/technology*
- **Need:** individual and premium products that perform
- **Individuality focus:** something special for me
Trend: Pure & Elegant Performance
In a nutshell

- Strong trend combining nature with science/technology
- Increasing demand for products with a perceivable benefit
- Search for multifunctional products

DSM’s PENTAVITIN® completely fulfill these needs
PENTAVITIN®
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1. Insights into current consumer trends
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PENTAVITIN®
ECOCERT approved and NATRUE certified

• INCI
  Saccharide Isomerate (active)
  Aqua, Citric Acid, Sodium Citrate

• Preservative free

• Appearance:
  clear, yellowish to slightly amber
coloured, slightly viscous liquid

• Certification

PENTAVITIN®
Ecocert approved
100% Natural Origin
0% Plant Ingredient

Raw material approved by Ecocert Greenlife according to the Ecocert Standard
for Natural and Organic Cosmetics available at http://cosmetics.ecocert.com

PENTAVITIN®
2% Natural (0% Organic)
48% Water
50% Derived natural
0% Nature-identical

Complies with the NATRUE Criteria.

• Registered in China
PENTAVITIN®
Unique composition

<table>
<thead>
<tr>
<th>Compound</th>
<th>Carbohydrate fraction of the SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psicose</td>
<td>0.2</td>
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<tr>
<td>Glucose</td>
<td>2.2</td>
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<tr>
<td>Mannose</td>
<td>3</td>
</tr>
<tr>
<td>Fructose</td>
<td>31.1</td>
</tr>
<tr>
<td>Glucose</td>
<td>46.7</td>
</tr>
<tr>
<td>Galactose</td>
<td>2.1</td>
</tr>
<tr>
<td>Various</td>
<td>14.7</td>
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</table>

PENTAVITIN®’s composition is very similar

- Unique composition similar to that of the carbohydrate complex (NMF) found in human skin
- Derived from plant based D-glucose
PENTAVITIN®

Benefits

- NMF
- Cornified envelope
- Hyaluronan
- Ceramides

Deep hydration for 72 hours

Binding hydration

Instant deep hydration

Visible improvements in skin appearance

- Flakiness
- Tightness

Epidermal barrier

- Softness
- Smoothness

- Itchiness
- Stinging

comfortable skin feeling & healthy skin appearance

short term

mid term

long term
PENTAVITIN®
Unique binding ensures a mechanism for deep hydration

• Unique binding mechanism to the skin that is not washed off
• The removal of PENTAVITIN® occurs only by the natural process of desquamation
• Proven binding to amino acid lysine (free ε-amino groups) at the corneocytes

PENTAVITIN®
Stimulates key genes playing a role in the skin barrier

PENTAVITIN® upregulates the filaggrin, loricrin, hyaluronan synthase3 and acid sphingomyelinase gene expression levels
PENTAVITIN® - *in vivo* Efficacies

**Study details**

<table>
<thead>
<tr>
<th>2 weeks</th>
<th>T&lt;sub&gt;0&lt;/sub&gt;</th>
<th>4 weeks</th>
<th>T&lt;sub&gt;T4W&lt;/sub&gt;</th>
<th>6 days</th>
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<tbody>
<tr>
<td>Wash out phase</td>
<td>T&lt;sub&gt;0&lt;/sub&gt;</td>
<td>Treatment phase</td>
<td>T&lt;sub&gt;T4W&lt;/sub&gt;</td>
<td>Regression phase</td>
</tr>
</tbody>
</table>

- 12 female subjects, 40±1 y
- Evaluated skin area: calf
- No application of cosmetics
- Standardized shower gel

- 1% aqueous PENTAVITIN
- Twice daily application

**Measurements before and after 4w treatment phase:**
1. Clinical grading according to Kligman scale
2. Barrier disruption induced by tape stripping
   Assessment of barrier repair by TEWL
3. Macrophotographs
4. Questionnaire before and after 2w & 4w treatment phase

**Measurements and clinical grading 3d (72 hours) & 6d after treatment phase**

No application of PENTAVITIN
PENTAVITIN® - *in vivo* Efficacy

Significant improvement in appearance

- Macrophotographs demonstrating significant improvement in skin appearance after 4 weeks application of 1% PENTAVITIN®

- Stratum corneum desquamation has clearly been normalized.
1% PENTAVITIN® reduces signs of dry skin by 20% after 4 weeks according to Kligman’s clinical grading. After the last treatment the effects of PENTAVITIN® last for 72 hours.
PENTAVITIN® - *in vivo* Efficacy

Strengthens skin barrier function

1% PENTAVITIN® strengthens skin barrier function shown by 20% reduction in TEWL before and after 20 subsequent tape strippings after a 28 day application.
PENTAVITIN® - *in vivo* Efficacy

Implements a comfortable skin feeling & a healthy skin appearance

Consumer panel testing confirms after 2 weeks that 1% PENTAVITIN®

- improves skin softness and smoothness by more than 50%
- reduces flakiness by more than 50%
- reduces itchiness by more than 50% and tightening by more than 30%
- improves skin robustness by more than 20%
## PENTAVITIN® - *in vivo* Efficacies

### Study details

<table>
<thead>
<tr>
<th></th>
<th>1 week</th>
<th>2 weeks</th>
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</thead>
<tbody>
<tr>
<td><strong>Wash out phase</strong></td>
<td></td>
<td></td>
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<tr>
<td>female subjects, 35-55 y</td>
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<td></td>
</tr>
<tr>
<td>No application of cosmetics</td>
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<td></td>
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<tr>
<td><strong>Treatment phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test formulations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) 5% PENTAVITIN® containing cream</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) 5% Glycerin containing cream</td>
<td></td>
<td></td>
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<tr>
<td>Application: twice daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test device: NOVA DPM 9003</td>
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</tbody>
</table>

1. **Skin Hydration Test**
   - Static test, provides information about the skin hydration
   - Measurements before/after 2 weeks treatment
   - Evaluated skin area: calf (= dry skin); volar forearm (= normal skin)

2. **Moisture Accumulation Test (MAT)**
   - Dynamic test, provides informations about the hydration retention capacity of skin
   - Measurements after 2 weeks
   - Evaluated skin area: forearm
PENTAVITIN® - *in vivo* Efficacy

Instant deep hydration

PENTAVITIN® retains instantly more moisture in the skin than glycerin
5% PENTAVITIN® outperforms 5% glycerin significantly after a 14-day application

• by 43% more hydration on dry skin and
• by 42% more hydration on normal skin
PENTAVITIN® - *in vivo* Efficacy

Study details

**Anti-Irritant test:**

- 12 female volunteers, aged 40 to 60 with normal to dry and slightly sensitive skin

- Formulation containing 5% AHA (lactic acid) with and without 5% PENTAVITIN®, pH 3.0

- Application on the left and right sides of their faces, during four weeks

- Measurements at day 0, 5, 10, 15, 20, 25 and day 28

- Efficacy evaluated with stinging scores

PENTAVITIN® - *in vivo* Efficacy
Reduces AHA induced irritation

PENTAVITIN® reduces AHA induced irritation by approximately 22 % after 28 days

Rinse-off *in vivo* efficacy

**Study design**

- **18 subjects**, age 32-46, skin type II/III, 13 female and 5 male (performed by Laboratoire DERMSCAN)

- Ingredient concentrations: 0.2% PENTAVITIN® and 0.03% Bisabolol (solubilized in 0.03% PEG-40 hydrogenated castor oil) as leading benchmark both solved in water

- 14 days treatment with ingredient solutions under *rinse-off conditioning* at the forearm

- Skin irritation and barrier disruption induced by *tape stripping*

- **Assessment of barrier repair by TEWL** (Tewameter TM 300®) and **irritation by Skin Colorimetric Measurement** (Colorimeter CL400®, a-value: green-to-red spectrum)

- Measurement after 2 hours, 1, 3 and 4 days and statistical analysis
Rinse-off *in vivo* efficacy

Application method

- **Standardized application** (2μl/cm²) of products on pre-defined forearm areas
- **Humidify** the application area with a water atomizer (to mimic showering) (1 spray every 10 seconds)
- **Apply** products with soft circular massage using a fingerstall for 3 minutes simulating the washing with a shampoo for example
- **Standardized rinsing** for 1 minute by using three water soaked cotton pad
- **Finally a standardized drying** by tapping with a paper tissue and constant pressure (3 passages)
**Rinse-off in vivo efficacy**

*First Rinse-off Soothing for Deep Hydration*

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Full repair defined at TEWL levels before stripping:
- TEWL data normalized to 100%
- 0.2% Pentavitin fully repaired after 3 days (significant $p<0.05$)
- Bisabolol benchmark needs 4 days for repair (non significant)
- Non-treated control is even after 7 days not fully repaired

*Δ 24 hours*

- TEWL was very constant during 14d pre-treatment
- Stripping induced a TEWL increase of at least times 2

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- **PENTAVITIN (0.2%)** repairs scalp barrier 2.3 times faster than control
- **PENTAVITIN (0.2%)** is 24 hours faster than leading benchmark
**Rinse-off *in vivo* efficacy**

First Rinse-off Soothing for Deep Hydration

-PENTAVITIN (0.2%) shows double effectiveness compared to leading benchmark

Reduction of irritation intensity based on a-value calculation

- 0.2% Pentavitin reduces irritation by 12% and 17% after 2h and 1 day
- Bisabolol benchmark reduces irritation by 6% and 8% after 2h and 1 day

❖ PENTAVITIN (0.2%) shows double effectiveness compared to leading benchmark
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Conclusions PENTAVITIN®

Unique product features

• Unique skin identical carbohydrate complex
• Unique binding mechanism
• NATRUE certified and ECOCERT approved

Benefits

• Instant, deep hydration
• Deep hydration for 72 hours
• Strengthens skin barrier function
• Stimulates key genes for skin barrier improvement

• First Rinse-off Soothing for Deep Hydration
• Proven effects at low concentrations
Conclusions applications

PENTAVITIN ® for ….

• Soft & smooth skin
  by instant deep hydration lasting for 72 hours

• Healthy scalp for beautiful hair
  by effective soothing in rinse-off applications