Korea's premier active raw material company is Ready to take on a new challenge

Since 1989, Damy has been making a constant effort to be the trusted partner providing high quality raw materials for clients.

Based on the motto of the company ‘Originality, Sincerity, Pioneer’ Damy shares the vision for development and growth in materials with customers.

Damy Materials Research Institute has made stable relationships with clients for a prompt respond to the needs of clients. Damy is making every concerted effort to create innovation and to provide unique solution in cosmetics market as a hidden champion.

Alternative for Cosmetic technology is Bio-technology

- Bio-Engineering
- Fermentation Engineering
- Genetic Engineering
- Cell Engineering
- Bio Chemistry

- Insoluble Material
- Unstable Material
- Ecosystem Interruption
- Limitation in Chemical Based Technology
- Solubilization
- Stabilization
- Safety
- Eco-friendly
- BIO-Alternatives
<table>
<thead>
<tr>
<th>Product list</th>
<th>Product name</th>
<th>INCI name</th>
<th>Benefits &amp; Uses</th>
<th>Physical form</th>
<th>Recommended dosage</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Barrier Repair</td>
<td>Ceramide3B ST(20%)</td>
<td>Mannosylerythritol lipid, Ceramide 3, Dipropylene glycol, Butylene glycol, 1,2-Hexanediol, Polysorbate 20, Glycerin, Stearoyl glutamic acid, Lauroyl glutamic acid, Polysorbate 80, Cetyl alcohol, Propanediol</td>
<td>- Skin barrier enhancement</td>
<td>Paste</td>
<td>2.0~3.0%</td>
<td>Water soluble ceramide 3 in high transparency through Damy's solubilizing technology. It contains 20% of ceramide3B</td>
</tr>
<tr>
<td></td>
<td>Ceramide3B DP(10%)</td>
<td>Pseudozyma/epicola/soybean flour/olive fruit oil ferment filtrate, Mannosylerythritol lipid, Ceteareth-20, PEG 40-Hydrogenated castor oil, Ceramide 3, Polysorbate 20, Cetearyl alcohol, Propanediol</td>
<td>- Anti-allergy - Anti-wrinkle - Anti-porphyrin - Resistance against UV - Moisturizing</td>
<td>Colorless transparent liquid</td>
<td>2.0~3.0%</td>
<td>Water and oil soluble ceramide 3 in high transparency through Damy's solubilizing technology. It contains 10% of ceramide3B</td>
</tr>
<tr>
<td></td>
<td>Ceramide3B DPS(1%)</td>
<td>Water, Butylene glycol, 1,2-Hexanediol, Pseudozyma/epicola/soybean flour/olive fruit oil ferment filtrate, Mannosylerythritol lipid, Ceteareth-20, PEG 40-Hydrogenated castor oil, Ceramide 3, Polysorbate 20, Cetearyl alcohol, Propanediol</td>
<td>- Skin barrier enhancement - Anti-aging - Skin rejuvenation - Elasticity enhancement - Moisturizing</td>
<td>Transparent viscous liquid</td>
<td>2.0~3.0%</td>
<td>It contains 1% of ceramide3B</td>
</tr>
<tr>
<td></td>
<td>Ceramide3B DPS(0.5%)</td>
<td>Water, Butylene glycol, 1,2-Hexanediol, Pseudozyma/epicola/soybean flour/olive fruit oil ferment filtrate, Mannosylerythritol lipid, Ceteareth-20, PEG 40-Hydrogenated castor oil, Ceramide 3, Polysorbate 20, Cetearyl alcohol, Propanediol</td>
<td>- Anti-allergy - Anti-wrinkle - Anti-porphyrin - Brightening</td>
<td>Transparent viscous liquid</td>
<td>2.0~3.0%</td>
<td>New version of B9-Vitapol, glycyrrhiza acid ferment extract is added to give powerful anti-irritation and brightening effect</td>
</tr>
<tr>
<td>Anti-allergy/Anti-wrinkle</td>
<td>B9-Vitapol</td>
<td>Butylene glycol, 1,2-Hexanediol, Bacillus/soybean/folic acid ferment extract, Sodium hyaluronate</td>
<td>- Anti-allergy - Anti-wrinkle - Anti-porphyrin - Resistance against UV - Moisturizing</td>
<td>Yellow transparent viscous liquid</td>
<td>3.0~5.0%</td>
<td>Reformulated form of folic acid through the structural changes by microbial fermentation system. It provides benefits of folic acid in high stability and solubility</td>
</tr>
<tr>
<td></td>
<td>VB9-Plus</td>
<td>Butylene glycol, 1,2-Hexanediol, Bacillus/soybean/folic acid ferment extract, Dipotassium glycyrrhizate, Sodium hyaluronate</td>
<td>- Anti-allergy / Anti-irritation - Anti-wrinkle - Anti-porphyrin / Brightening - Resistance against UV - Moisturizing</td>
<td>Yellow transparent viscous liquid</td>
<td>3.0~5.0%</td>
<td>New version of B9-Vitapol, glycyrrhiza acid ferment extract is added to give powerful anti-irritation and brightening effect</td>
</tr>
<tr>
<td>Anti-irritation/Resistance against UV</td>
<td>Aqua-proVita D3</td>
<td>Glycerin, Hydroxypropyl cyclodextrin, 7-dehydrocholesterol</td>
<td>- Skin barrier function - Reduce skin irritation - Anti-microbial activation - Resistance against UV</td>
<td>Yellow transparent viscous liquid</td>
<td>3.0~5.0%</td>
<td>The best out of 7-DHC which is pro-vitamin D3 through exclusive stabilization technology</td>
</tr>
<tr>
<td>Anti-aging/Anti-wrinkle</td>
<td>BIO-Placenta</td>
<td>Water, Lecithin, Acetyl glutamine, sh-Oligopeptide-1, sh-Oligopeptide-2, sh-Polypeptide-1, sh-Polypeptide-9, sh-Polypeptide-11, Bacillus/soybean/folic acid ferment extract, Sodium hyaluronate, Caprylyl glycol, Butylene glycol, 1,2-Hexanediol</td>
<td>- Anti-wrinkle - Skin rejuvenation - Elasticity enhancement - Moisturizing - Cell vitalization</td>
<td>Yellow transparent liquid</td>
<td>3.0%</td>
<td>Combination of five growth factors(EGF, IGF-1, acidic FGF, basic FGF and VEGF), amino acid and vitamin to give similar effect of human placenta</td>
</tr>
<tr>
<td></td>
<td>BIO-Placenta T</td>
<td>Water, Lecithin, Acetyl glutamine, sh-Oligopeptide-1, sh-Oligopeptide-2, sh-Polypeptide-1, sh-Polypeptide-9, sh-Polypeptide-11, Bacillus/soybean/folic acid ferment extract, Sodium hyaluronate, Caprylyl glycol, Butylene glycol, 1,2-Hexanediol</td>
<td>- Anti-wrinkle - Skin rejuvenation - Elasticity enhancement - Moisturizing - Cell vitalization</td>
<td>Yellow transparent liquid</td>
<td>3.0~5.0%</td>
<td>Economical version of BIO-Placenta. Combination of five growth factors(EGF, IGF-1, acidic FGF, basic FGF and VEGF), amino acid and vitamin to give similar effect of human placenta</td>
</tr>
<tr>
<td>Whitening/Skin toning</td>
<td>Lumitide*</td>
<td>Propanediol, Water, Glycerin, Glyceryl acrylate/acrylic acid copolymer, Polysorbate 20, Cyclopentasiloxane, Hexapeptide-33</td>
<td>- Whitening - Anti-pigment - Skin-toning - Improved uneven color</td>
<td>Slightly transparent viscous liquid</td>
<td>2.0%</td>
<td>Whitening effect through inactivation of melanogenesis by intracellular signaling</td>
</tr>
<tr>
<td>Product name</td>
<td>INCI name</td>
<td>Benefits &amp; Uses</td>
<td>Physical form</td>
<td>Recommended dosage</td>
<td>Properties</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
<td>-----------------</td>
<td>---------------</td>
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<td>------------</td>
<td></td>
</tr>
<tr>
<td><strong>Moisturizing/ Anti-irritation</strong></td>
<td>Glucosal 120</td>
<td>Aureobasidium pullulans ferment extract, Propanediol, Butylene glycol, 1,2-Hexanediol, Disodium EDTA</td>
<td>- Moisturizing - Anti-irritation - Immune function - Repair of damaged skin</td>
<td>Slightly transparent viscous liquid</td>
<td>2.0~5.0 %</td>
<td>High ratio of β-glucan in high yield from microbial fermentation technology</td>
</tr>
<tr>
<td><strong>Moisturizing/ Anti-stress</strong></td>
<td>Hydracell Q</td>
<td>Acetyl glutamine</td>
<td>- Anti-stress - Bio-synthesis of collagen - Cell activation - Cell growth stimulation</td>
<td>White powder</td>
<td>1.0~2.0%</td>
<td>Acetylated glutamine, long lasting hydration into the cell</td>
</tr>
<tr>
<td><strong>Moisturizing/ Anti-aging</strong></td>
<td>Hydroderma-SE</td>
<td>Aureobasidium pullulans ferment extract, Propanediol, Butylene glycol, 1,2-Hexanediol, Glycopolypeptide, Disodium EDTA</td>
<td>- Moisturizing - Anti-aging - Skin soothing - Skin regeneration</td>
<td>Slightly transparent viscous liquid</td>
<td>3.0~5.0%</td>
<td>Combination of glycoprotein from snail secretion extract and β-glucan to provide synergic effect on moisturizing</td>
</tr>
<tr>
<td><strong>Anti-aging/ Anti-stress</strong></td>
<td>Sigmedia</td>
<td>Water, Butylene glycol, Polysorbate 80, Lecithin, Dipropylene glycol, Phytosphingosine phosphate, 1,2-Hexanediol, Caprylyl glycol</td>
<td>- Anti-aging - Anti-stress - Skin rejuvenation - Cell revitalization</td>
<td>Yellow transparent liquid</td>
<td>3.0%</td>
<td>Liposome type of Phytosphingosine-1-Phosphate which is mimic of Sphingosine-1-Phosphate (intracellular signaling molecule for anti-aging)</td>
</tr>
<tr>
<td><strong>Nature Friendly Preservative</strong></td>
<td>EDE-cide plus</td>
<td>Octanediol, Ethylhexyl glycerin, Grapefruit seed extract, Artemisia princeps extract</td>
<td>- Anti-bacterial - Paraben free - Safe and nature friendly</td>
<td>Yellow transparent viscous liquid</td>
<td></td>
<td>Skin softener, Toner, Essence : 0.4%, Lotion, Cream, Emulsion : 0.6%</td>
</tr>
<tr>
<td><strong>Fermentoil Series</strong></td>
<td>Fermentoil Olive</td>
<td>Pseudozyma epicola/soybean flour/ olive fruit oil ferment filtrate</td>
<td>- Non-greasy feeling - Improved skin absorption - Improved emulsifying capacity - Improved compatibility - Increased beneficial free fatty acid value</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Creating new category of plant oil through the exclusive oil fermentation technology to enhance higher beneficial free fatty acid values, improved skin absorption and emulsifying capacity</td>
</tr>
<tr>
<td><strong>Fermentoil Series</strong></td>
<td>Fermentoil Argan</td>
<td>Pseudozyma epicola/soybean flour/ argania spinosa kernel oil ferment filtrate</td>
<td>- Non-greasy feeling - Improved skin absorption - Improved emulsifying capacity - Improved compatibility - Increased beneficial free fatty acid value</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from Angelica gggg</td>
</tr>
<tr>
<td><strong>Fermentoil Series</strong></td>
<td>Fermentoil Green tea seed</td>
<td>Pseudozyma epicola/camellia sinensis seed oil/glucose/ glycine soja (soybean) meal/malt extract/yeast extract ferment filtrate</td>
<td>- Non-greasy feeling - Improved skin absorption - Improved emulsifying capacity - Improved compatibility - Increased beneficial free fatty acid value</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from each Korean medicinal herb</td>
</tr>
<tr>
<td><strong>Korean Medicinal Herb Fermentoil Series</strong></td>
<td>Fermentoil Angelica</td>
<td>(Pending) Pseudozyma epicola/soybean flour/ olive fruit oil / angelica gigas root extract ferment filtrate</td>
<td>- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from Angelica gggg</td>
</tr>
<tr>
<td><strong>Korean Medicinal Herb Fermentoil Series</strong></td>
<td>Fermentoil Artemisia</td>
<td>(Pending) Pseudozyma epicola/soybean flour/ olive fruit oil / artemisia princeps extract ferment filtrate</td>
<td>- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from Artemisia princeps</td>
</tr>
<tr>
<td><strong>Korean Medicinal Herb Fermentoil Series</strong></td>
<td>Fermentoil Red ginseng</td>
<td>(Pending) Pseudozyma epicola/soybean flour/ olive fruit oil / panax ginseng root extract ferment filtrate</td>
<td>- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from Red ginseng</td>
</tr>
<tr>
<td><strong>Korean Medicinal Herb Fermentoil Series</strong></td>
<td>Fermentoil Glycyrrhiza</td>
<td>(Pending) Pseudozyma epicola/soybean flour/ olive fruit oil / glycyrrhiza uralensis (licorice) root extract ferment filtrate</td>
<td>- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from Glycyrrhiza uralensis</td>
</tr>
<tr>
<td><strong>Korean Medicinal Herb Fermentoil Series</strong></td>
<td>Fermentoil Leonurus</td>
<td>(Pending) Pseudozyma epicola/soybean flour/ olive fruit oil / leonurus sibiricus extract ferment filtrate</td>
<td>- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from Leonurus sibiricus</td>
</tr>
<tr>
<td><strong>Korean Medicinal Herb Fermentoil Series</strong></td>
<td>Fermentoil Saururus</td>
<td>(Pending) Pseudozyma epicola/soybean flour/ olive fruit oil / saurus chinensis extract ferment filtrate</td>
<td>- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb</td>
<td>Oil</td>
<td>Up to 99%, depending on formulation</td>
<td>Benefits from Fermentoil and functional elements from Saururus chinensis</td>
</tr>
</tbody>
</table>
Ceramide3B ST/DP/DPS

Now, You can feel the real ceramide

Water soluble ceramide 3 in high transparency through Damy’s solubilizing technology

<table>
<thead>
<tr>
<th>Ceramide3B ST</th>
<th>Ceramide3B DP</th>
<th>Ceramide3B DPS (1%)</th>
<th>Ceramide3B DPS (0.5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water soluble ceramide 3 in high transparency</td>
<td>Water and oil soluble ceramide 3 in high transparency</td>
<td>Definition</td>
<td>10% of Ceramide3B DP in solution</td>
</tr>
<tr>
<td>20%</td>
<td>10%</td>
<td>Ceramide3B Content</td>
<td>1%</td>
</tr>
<tr>
<td>Mannosylerthritol lipid, Ceramide 3, Dipropylene glycol, Butylene glycol, 1,2-Hexanediol, Polysorbate 20, Glycerin, Stearyl glutamic acid, Lauroyl glutamic acid, Polysorbate 80, Cocosyl glutamic acid</td>
<td>Pseudozyna/eplica/soybean flour/olive fruit oil ferment filtrate, Mannosylerthritol lipid, Ceteareth-20, PEG 40-Hydrogenated castor oil, Ceramide 3, Polysorbate 20, Cetearyl alcohol, Propanediol</td>
<td>INCI</td>
<td>Water, Butylene glycol, 1,2-Hexanediol, Pseudozyna/eplica/soybean flour/olive fruit oil ferment filtrate, Mannosylerthritol lipid, Ceteareth-20, PEG 40-Hydrogenated castor oil, Ceramide 3, Polysorbate 20, Cetearyl alcohol, Propanediol</td>
</tr>
<tr>
<td>Paste</td>
<td>Paste</td>
<td>Physical form</td>
<td>Colorless transparent liquid</td>
</tr>
<tr>
<td>2.0~3.0%</td>
<td>2.0~3.0%</td>
<td>Recommended dosage</td>
<td>2.0~3.0%</td>
</tr>
</tbody>
</table>

Benefits & Uses

Skin barrier enhancement, Anti-aging, Skin rejuvenation
Elasticity enhancement, Moisturizing

Application

Skin, Body, Sun and Hair care

Composition of Skin Lipids

Skin barrier lipid consists 40~50% of Ceramide
Crystalization of Ceramide

As ceramide crystalizes easily, it is usually unstable in liquid phase.

Ceramide has been used in the form of emulsion and liposome type for maintaining its stability in the formulation.

New BIO-surfactant

MEL (Mannosylerythritol Lipid)

Hydrophobic

Combines with Ceramide

Asymmetric structure

Prohibit Ceramides from crystalization

Anti-crystallization of MEL

MEL inhibits crystalization of ceramide and helps ceramide to become soluble in water

Ceramide level decreases rapidly with age

<table>
<thead>
<tr>
<th>Age</th>
<th>Ceramide level</th>
</tr>
</thead>
<tbody>
<tr>
<td>21–30 years</td>
<td>100%</td>
</tr>
<tr>
<td>31–40 years</td>
<td>78%</td>
</tr>
<tr>
<td>41–50 years</td>
<td>63%</td>
</tr>
<tr>
<td>21–30 years</td>
<td>100%</td>
</tr>
<tr>
<td>31–40 years</td>
<td>62%</td>
</tr>
<tr>
<td>41–50 years</td>
<td>37%</td>
</tr>
</tbody>
</table>


Morphology Analysis

According to SEM, the morphology of Ceramide3B ST solution is in stable sphere form.

Stability Test

Ceramide3B ST solution is stable according to measuring zeta potential.

Long Term Storage Stability

Ceramide3B ST solution is still in the form of liquid crystal after 1 month storage.

After 1 month storage

Ceramide3B ST solution (Containing 0.5% ceramide)

After 1 month storage

Ceramide 0.5% solution

Solubilization

New solution

Insoluble Material

Ceramide3B ST/DP/DPS
B₉-Vitapol

Vitamin B₉ (Folic acid), NOW you can apply on skin

Reformulated form of folic acid through the structural changes by microbial fermentation system. It provides benefit of folic acid in high stability and solubility.

INCI
Butylene glycol, 1,2-Hexanediol, Bacillus/soybean/folic acid ferment extract, Sodium hyaluronate

Benefits & Uses
Anti-wrinkle
Anti-allergy
Anti-porphyrin
Resistance against UV
Moisturizing

Physical form
Yellow transparent viscous liquid

Application
Skin, Body, Sun and Hair care

Recommended dosage
3.0~5.0%

Vitamin B₉ is commonly known as folic acid
Found in green leafy vegetables

Function of folic acid in human body
Stimulate protein metabolism and immune system
Prevent from cancer and vascular disease caused by homocystein

Food and replacement
FDA recommended consumption: 400~600mcg/day Synthetic folic acid

What’s Vitamin B₉?

Effect of Folic acid on Skin

Cell growth stimulation

![Graph showing cell growth stimulation](image)

Anti-wrinkle

![Image showing anti-wrinkle effect](image)

Prevention of UV-induced damage

![Graph showing UV protection](image)

Aline H., DSM Nutritional products Ltd., Switzerland
**Anti-wrinkle**

- Eye-wrinkle

Lotion containing 5% of B₉-Vitapol twice a day for 4 weeks / 10 volunteers

Detection method: Facial Analysis System

Reduces wrinkles by 27.8% in 4 weeks with B₉-Vitapol

**Anti-allergy**

- Degranulation assay

Reduction of releasing histamine from mast cell and leukocyte

Control

Allergen treated

Normal cell

B₉-Vitapol + Allergen
**VB₉-Plus**

Vitamin B₉ (Folic acid), NOW you can apply on skin plus anti-irritation and brightening effect

New version of B₉-Vitapol, glycyrrhiza extract is added to give powerful anti-irritation and brightening effect.

<table>
<thead>
<tr>
<th>INCI</th>
<th>Physical form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butylene glycol, 1,2-Hexandiol, Bacillus/soybean/folic acid ferment extract, Dipotassium glycyrrhizate, Sodium hyaluronate</td>
<td>Yellow transparent viscous liquid</td>
</tr>
</tbody>
</table>

**Benefits & Uses**
- Anti-wrinkle
- Anti-allergy / Anti-irritation
- Anti-porphyrin / Brightening
- Resistance against UV
- Moisturizing

**Application**
- Skin, Body, Sun and Hair care

**Recommended dosage**
- 3.0~5.0%

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**Structure of Folic acid**

**Limitation**
- Hard to apply in Cosmetics
- Sensitive to pH change
- Low solubility

**New Solution**

**Improved Stability for Cosmetics**

**Folic acid**
- Solubilization above pH 7

**B₉-Vitapol**
- Solubilization & Stabilization in pH 4.5~7

**DAMY Fermentation**

**Structure of Folic acid**

**Basic**
- Pteroyl group

**Acidic**
- Glutamic acid group

**γ-polyglutamate**
- Fermentation

**New Solution**

**Basic**
- Pteroyl group

**Acidic**
- Glutamic acid group (Polymer)
**Glycyrrhizic acid**

- **Anti-irritation**
- Brightening

![Glycyrrhizic acid](image)

**Anti-irritation**

24h Patch test

Observed skin irritation after 24 hours since detaching the patch (24h) on the left forearm with 10 volunteers

<table>
<thead>
<tr>
<th>SLS + 3% VB9-Plus</th>
<th>SLS + 5% VB9-Plus</th>
<th>SLS + 5% Portulaca extract</th>
<th>SLS</th>
<th>D/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>no irritation induced</td>
<td>no significant improvement</td>
<td>significant improvement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Number of volunteer | 2 | 1 | 7 |

88% of volunteers have experienced anti-irritation effect

**Multi-function from Folic acid**

- Anti-wrinkle / Anti-allergy / Anti-porphyrin
- Resistance against UV / Moisturizing

**Anti-irritation, Brightening Effect**

from Glycyrrhizic acid

**Brightening**

Lotion containing 5% of VB9-Plus twice a day for 4 weeks with 14 volunteers

Detection method: Facial Analysis System

- Skin tone has been improved 3.3% in 4 weeks (Male 4.5%, Female 2.6%)

![Graph showing improvement rates of skin tone](image)

**Improvement rates of skin tone (%)**

- 0 week
- 2 weeks
- 3 weeks

- Skin tone has been improved 3.3% in 4 weeks (Male 4.5%, Female 2.6%)

- Pigmentation (UV) 27 / 25%
- Pigmentation (PL) 18 / 10%

- Skin tone 50 / 67%
- Skin tone 57 / 67%
- Skin tone 50 / 64%
- Skin tone 56 / 64%

- 4 weeks
Aqua-proVita D₃
One step closer and easier, soluble Vitamin D₃
The best out of 7-DHC which is pro-vitamin D₃ through exclusive stabilization technology

**INCI**
Glycerin, Hydroxypropyl cyclodextrin, 7-dehydrocholesterol

**Benefits & Uses**
Skin barrier function
Reduce skin irritation
Anti-microbial activation
Resistance against UV

**Physical form**
Yellow transparent viscous liquid

**Application**
Skin, Body, Sun and Hair care

**Recommended dosages**
3.0~5.0 %

**Mechanism**

- **Major Source**
  - UV light exposure on skin

- **Vitamin D₃**

- **Calcitriol**
  - (1,25-dihydroxyvitamin D₃)

- **50~70% of population is deficient of Vitamin D**

- **Improved Skin Barrier Function**
  - Regulates keratinocyte differentiation, induces involucrin, a protein important for the skin barrier function

- **Anti-microbial activation**
  - Induces expression of antimicrobial peptide LL37, works on skin diseases such as atopic dermatitis and eczema

- **Protection of the hair follicle**
  - Reduces degree of apoptosis on follicle and improves hair shaft regrowth

- **Protection from UV Irradiation**
  - Protects cells from UV irradiation by inducing apoptosis of DNA damages by decreasing sunburn cells

- **Supply Vitamin D by food is not enough**
  - 400 I.U. = 19 Eggs(Yolks)

- **Major energy source of Vitamin D₃ biosynthesis**
  - is UV exposure
Aqua-proVita D3

Hydrophobic 7-DHC

Inclusion of 7-DHC

Hydrophilic 7-DHC

Combined by Hydrophobic interaction

Inclusion Complex

7-DHC

Cyclodextrin

25°C ~ 70°C

Stable for Wide Range of Temperature

Soluble in Water Formulation

Stable at UV Radiation

Aging and 7-DHC

7-DHC decreases according to age

<table>
<thead>
<tr>
<th>Age</th>
<th>7-DHC epidermis</th>
<th>7-DHC dermis</th>
<th>% Formation preD3 with 8-yr-old</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1,308</td>
<td>406</td>
<td>36</td>
</tr>
<tr>
<td>18</td>
<td>1,056</td>
<td>346</td>
<td>22</td>
</tr>
<tr>
<td>77</td>
<td>605</td>
<td>144</td>
<td>24</td>
</tr>
<tr>
<td>77</td>
<td>490</td>
<td>141</td>
<td>-</td>
</tr>
<tr>
<td>82</td>
<td>659</td>
<td>163</td>
<td>20</td>
</tr>
</tbody>
</table>

Amount of Vitamin D3 on skin decreases according to age

Reference: 2013 May 2 The Journal of the American Academy of Dermatology; Vitamin D effects in atopc dermatitis; Zbigniew Samochocki, MD, PhD et al. From the Departments of dermatology at Medical University of Warsaw, Medical University of Lodz, University of North Carolina, Department of Biochemistry and Experimental Medicine, Children’s Memorial

7-DHC Content Analysis

Sample: 100 times diluted solution of Aqua-proVita D3
Detection method: UV Spectrophotometer System (Biochrom Libra S22)

Stable for Wide Range of Temperature

Benefit

Improvement of Skin Irritation
Skin soothing evaluation test
Lotion containing 5% of Aqua-proVita D3
3 times a day for 9 days / 10 volunteers
Detection method: Skin Visiometer SV 600(CK, Germany)
INCI
Water, Lecithin, Acetyl glutamine, sh-Oligopeptide-1, sh-Oligopeptide-2, sh-Polypeptide-1, sh-Polypeptide-9, sh-Polypeptide-11, Bacillus/soybean/folic acid ferment extract, Sodium hyaluronate, Caprylyl glycol, Butylene glycol, 1,2-Hexanediol

Benefits & Uses
Anti-wrinkle
Skin rejuvenation
Elasticity enhancement
Moisturizing
Cell vitalization

Physical form
Yellow transparent liquid

Application
Skin, Body and Hair care

Recommended dosage
3.0%

Aging is caused by loss of Growth Factors (GF)

0~3 years old
Infants produce nutritional values and GF on their own.

10~13 years old
GF production decreases in body and growth rate starts to slow down.

More than 18 years old
GF production and the growth process decreases rapidly. Minimal amount is produced for metabolism.

Commonly known effects of dermatological efficacy of the placenta are Anti-aging & Skin rejuvenation
Reference: Placental growth factors, B.V.Rama Sastry, Placental pharmacology, p126~150

BIO-Placenta VS Human Placenta

<table>
<thead>
<tr>
<th>Growth Factor</th>
<th>Human Placenta</th>
<th>Effect</th>
<th>BIO-Placenta</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGF</td>
<td>Skin rejuvenation</td>
<td>EGF</td>
<td></td>
</tr>
<tr>
<td>IGF-1</td>
<td>Anti-wrinkle</td>
<td>IGF-1</td>
<td></td>
</tr>
<tr>
<td>Acidic FGF</td>
<td>Anti-wrinkle</td>
<td>Acidic FGF</td>
<td></td>
</tr>
<tr>
<td>Basic FGF</td>
<td>Elasticity enhancement</td>
<td>Basic FGF</td>
<td></td>
</tr>
<tr>
<td>VEGF</td>
<td>Nutritional supplement</td>
<td>VEGF</td>
<td></td>
</tr>
<tr>
<td>TGF-β</td>
<td>Anti-wrinkle</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>The minority parts</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Essential Factor

<table>
<thead>
<tr>
<th>Essential Factor</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin</td>
<td>Cell vitalization</td>
</tr>
<tr>
<td>Amino acids</td>
<td>Energy supplement</td>
</tr>
</tbody>
</table>

Synergic Effect through combined Growth Factors & Essential Factors

Fig. Effect of growth factor singling on wound epithelialization
Ref: Journal of Cell Science 116, 3227-3248
Subjects of experiment: 12 female aged 43 to 50 (average age: 45.75)
Place of experiment: Constant temperature and humidity room (22±1°C, 45±5%)
Experimental period: 4 weeks
Test sample: BIO-Placenta Cream (BIO-Placenta: 3%)

### Summary of Clinical Study

#### Anti-wrinkle

<table>
<thead>
<tr>
<th>Test area</th>
<th>Detection method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crow's feet</td>
<td>PRIMOS Lite 3D Face and Skin Scanner Analyzing System (GFMesstechnik)</td>
</tr>
</tbody>
</table>

Reduces wrinkles by 10% in 2 weeks and 21% in 4 weeks

<table>
<thead>
<tr>
<th>Test area</th>
<th>Detection method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below eyes</td>
<td>Robo Skin Analyzer CS50 (Inforward, Inc.)</td>
</tr>
</tbody>
</table>

Reduces wrinkles by 38% in 2 weeks and 46% in 4 weeks

<table>
<thead>
<tr>
<th>Test area</th>
<th>Detection method</th>
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<tbody>
<tr>
<td>Crow's feet</td>
<td>Robo Skin Analyzer CS50 (Inforward, Inc.)</td>
</tr>
</tbody>
</table>

Total length of wrinkle: 47mm

Reduces wrinkles by 10% in 2 weeks and 21% in 4 weeks

#### Skin Elasticity

<table>
<thead>
<tr>
<th>Test area</th>
<th>Detection method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial area</td>
<td>DermaLab elasticity probe (Cortex Technology, Inc.)</td>
</tr>
</tbody>
</table>

Improved by 32% in 2 weeks and 47% in 4 weeks

#### Moisturizing

<table>
<thead>
<tr>
<th>Test area</th>
<th>Detection method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial area</td>
<td>DermaLab moisture probe (Cortex Technology, Inc.)</td>
</tr>
</tbody>
</table>

Improved by 83% just after applying, 50% in 2 weeks and 64% in 4 weeks

μs = micro siemens, μs=1/10Ω, N=12
Lumitide+

Light up your skin cells and illuminate your skin

Whitening effect through inactivation of melanogenesis by intracellular signaling

INCI
Propanediol, Water, Glycerin, Glyceryl Acrylate/Acrylic Acid Copolymer, Polysorbate 20, Cyclopentasiloxane, Hexapeptide-33

Benefits & Uses
Whitening
Anti-pigment
Skin-toning
Improved uneven color

Physical form
Slightly transparent viscous liquid

Application
Skin, Body care

Recommended dosage
2%

Whitening Mechanism of Lumitide+
Hexapeptide-33 binds with GPCR and resists melanogenesis through intracellular signaling

Activation of ERK by GPCR (G-protein coupled receptor)-mediated signaling pathway
Phosphorylation of MITF by ERK
Degradation of MITF-p by ubiquitin-mediated pathway
Transcription of melanogenic enzymes (TYR/TRP-1/TRP-2) ↓
Melanogenesis ↓
Whitening and Toning

In-vivo

Lotion containing 2% Lumitide+, 2 times a day for 28 days with 12 volunteers

<table>
<thead>
<tr>
<th>Test area</th>
<th>Left forearm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection method</td>
<td>Mexameter MX18(Courage &amp; Khazaka Electronic GmbH, Germany)</td>
</tr>
</tbody>
</table>

Before UV radiation  | Non application  | Lumitide+  |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24 hours after UV radiation</td>
<td>Non application</td>
<td>Lumitide+</td>
</tr>
<tr>
<td>2 weeks after UV radiation</td>
<td>Non application</td>
<td>Lumitide+</td>
</tr>
<tr>
<td>4 weeks after UV radiation</td>
<td>Non application</td>
<td>Lumitide+</td>
</tr>
</tbody>
</table>

Whitening and Toning Parameters

In-vivo

Lotion containing 2% Lumitide+, 2 times a day for 28 days with 11 volunteers

<table>
<thead>
<tr>
<th>Area</th>
<th>Full face</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection method</td>
<td>VISIA Evolution (Canfield, US)</td>
</tr>
</tbody>
</table>

Suppression of melanin production

<table>
<thead>
<tr>
<th>Day 0</th>
<th>Day 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.023</td>
<td>0.029</td>
</tr>
<tr>
<td>0.045</td>
<td>0.058</td>
</tr>
<tr>
<td>0.068</td>
<td>0.089</td>
</tr>
<tr>
<td>0.09</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Suppression of porphyrin production

<table>
<thead>
<tr>
<th>Day 0</th>
<th>Day 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.003</td>
<td>0.006</td>
</tr>
<tr>
<td>0.006</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Increase of hemoglobin

<table>
<thead>
<tr>
<th>Day 0</th>
<th>Day 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.006</td>
<td>0.007</td>
</tr>
<tr>
<td>0.007</td>
<td>0.008</td>
</tr>
<tr>
<td>0.008</td>
<td>0.009</td>
</tr>
<tr>
<td>0.009</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Improvement of uneven color

<table>
<thead>
<tr>
<th>Day 0</th>
<th>Day 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.003</td>
<td>0.006</td>
</tr>
<tr>
<td>0.006</td>
<td>0.009</td>
</tr>
<tr>
<td>0.009</td>
<td>0.012</td>
</tr>
</tbody>
</table>
**Glucasol 120**

*Lock the moisture with invisible film to protect your skin*

High ratio of β-glucan in high yield from microbial fermentation technology

<table>
<thead>
<tr>
<th>INCI</th>
<th>Physical form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aureobasidium pullulans ferment extract, Propanediol, Butylene glycol, 1,2-Hexanediol, Disodium EDTA</td>
<td>Slightly transparent viscous liquid</td>
</tr>
</tbody>
</table>

**Benefits & Uses**
- Moisturizing
- Immune function
- Repair of damaged skin
- Anti-irritation

**Application**
- Skin, Body, Sun care, Makeup and Hair care

**Recommended dosage**
- 2.0~5.0%

**What’s β-glucan?**

β-glucan is a polysaccharide found in oats, barley, mushrooms, and yeasts

**Aureobasidium sp. BRD-109**

β-glucan is obtained through microbial fermentation

<table>
<thead>
<tr>
<th>Form</th>
<th>Smooth, pink, yeast-like colonies covered with a slimy mass of spores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyphae</td>
<td>Hyaline, smooth and thin-walled</td>
</tr>
<tr>
<td>Growth</td>
<td>10~35°C</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Older colonies change to black due to chlamydospore production</td>
</tr>
<tr>
<td>Metabolites</td>
<td>β-(1,3)(1,6)-Glucan</td>
</tr>
</tbody>
</table>
How to Obtain β-glucan
Comparing to cell wall extraction, Fermentation method is more beneficial for high yield and mass production.

Fermentation by Aureobasidium

Low yield
Impurities

High yield
High ratio of β-glucan
Mass production

Effect of Glucasol 120 on Skin

Moisturizing effect
Immediate hydration

Water soluble
Easy application for cosmetics

92% β-glucan
High ratio of β-glucan

Moisturizing Effect
Locks the moisture and gives Immediate hydration of skin

Non-toxicity and biodegradability

Soft texture
High viscosity
Emulsifying capacity
**Hydracell Q / QS**

*Water your skin cells like drinking aqua*

Acetylated glutamine, reformulated to improve the stability

<table>
<thead>
<tr>
<th>Hydracell Q</th>
<th>Hydracell QS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylated Glutamine which is reformulated to improve the stability</td>
<td>Definition</td>
</tr>
<tr>
<td>Acetyl glutamine</td>
<td>10% water solution version of Hydracell Q</td>
</tr>
<tr>
<td>White powder</td>
<td>INCI</td>
</tr>
<tr>
<td>1.0~2.0%</td>
<td>Water, Dipotassium phosphate, Acetyl glutamine, Butylene glycol, 1,2-Hexanediol, Sodium carboxymethyl cellulose</td>
</tr>
<tr>
<td></td>
<td>Physical form</td>
</tr>
<tr>
<td></td>
<td>Colorless transparent liquid</td>
</tr>
<tr>
<td>3.0~5.0%</td>
<td>Recommended dosage</td>
</tr>
</tbody>
</table>

**Benefits & Uses**

- Anti-stress
- Biosynthesis of collagen
- Cell activation
- Cell growth stimulation

**Application**

- Skin, Body, Sun and Hair care

---

**Function of Glutamine**

- Stress
- Energy Metabolism
- Immune Function
- Anti-stress Effect
- Swelling

**Correlation between Glutamine and ATP**

![Graph showing correlation between Glutamine (mM) and ATP (%)]
Hydracell Q / QS

Application to Cosmetics

<table>
<thead>
<tr>
<th>Glutamine</th>
<th>Hydracell Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>The amine is very unstable</td>
<td>Acetylated amino group</td>
</tr>
</tbody>
</table>

Improved Stability

Hyaluronic Acid (High molecular weight) 1,000,000 Da.

Hyaluronic Acid (Low molecular weight) 10,000 Da.

Hydracell Q (Single particle) 146 Da.

Summary of Clinical Study

| Subjects of experiment | 12 female aged 43 to 50 (average age : 45.75) |
| Place of experiment | constant temperature and humidity room (22±1°C, 45±5%) |
| Experimental period | 24 hours |
| Test sample | Hydracell Q Cream (Hydracell Q : 2%) |

24-hour Moisturizing

Test area | Facial area
Detection method | DermaLab moisture probe, Cortex Technology, Inc.

Skin Texture

| Test area | Left forehead |
| Detection method | PRIMOS Lite 3D Face and Skin Scanner Analyzing System, GFMesstechnik |

Epidermal Barrier Quality

| Test area | Left cheek |
| Detection method | Keratin sticker(KISCS), Digital light microscope(Advanced Microscopy Group) |

24-hour Moisturizing

| Test area | Left forearm |
| Detection method | DermaLab moisture probe, Cortex Technology, Inc. |

Average changes in Ra values(μs)

Before | After

Ra : Average of all heights and depths to the reference plane

Skin texture has been improved 11% after treatment

Epidermal barrier quality has been improved 40% after treatment

*Epidermal barrier quality score by observation of detached epidermal cells
Score: 1 = very mild, 2 = mild, 3 = moderate, 4 = rough, 5 = very rough
Hydroderma-SE

Make your skin healthy with self-healing ability from snail secretion

Combination of glycoprotein from snail secretion extract and β-glucan to provide synergic effect on moisturizing

<table>
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<td>Aureobasidium pullulans ferment extract, Propanediol, Butylene glycol, 1,2-Hexanediol, Glycoprotein, Disodium EDTA</td>
<td>Slightly transparent viscous liquid</td>
</tr>
</tbody>
</table>

Benefits & Uses

- Moisturizing
- Skin soothing
- Anti-aging
- Skin regeneration

Application

Skin, Body care and Make up

Recommended dosage

3.0~5.0%

Story of Snail Secretion

1970, Chile
People found that wound on hands of farmers who treat snail is repaired rapidly

1986, Spain
Snail secretion is studied as a new substance to be used as a treatment to the patients who suffered from dermatitis and burns due to Chernobyl nuclear explosion accident by Dr. Iglesias

Remarkable fact about snail

Snails have survived under extreme environmental conditions for more than 600 million years
Multi-function from Mucin

- **Moisturizing effect**
- **Anti-oxidant**
- **Fibroblast proliferation**
- **Anti-aging**
- **Activation of the tissue repair system**


---

**Proliferation**

Immunofluorescence staining

100 μg/mL of SCA with HaCaT and Human Fibroblast for 48 hrs

Expression of β-catenin and FAK has been enhanced


---

**Wound Healing**

Migration assay

100 μg/mL of SCA with Human Fibroblasts for 24 hrs

24hrs after SCA addition, the wound was completely occupied with cells


---

**Synergic Effect**

- **ß-glucan**
  - High molecular weight
  - locks the moisture in the skin

- **Glycoprotein**
  - Protein-protein interaction affinity
  - gives deeper immediate moisturizing effect
Sigmedia Awakening your skin cells through signals

Sigmedia is the liposome type of Phytosphingosine-1-Phosphate (PhS-1-P)
Sigmedia has similar structure to Sphingosine-1-Phosphate (S-1-P)
which affects cellular functions: signal transduction for anti-aging and anti-wrinkle

INCI
Water, Butylene glycol, Polysorbate 80, Lecithin, Dipropylene glycol, Phytosphingosine phosphate, 1,2-Hexanediol, Caprylyl glycol

Benefits & Uses
- Anti-aging
- Anti-wrinkle
- Skin rejuvenation
- Cell vitalization

Physical form
Yellow transparent liquid

Application
Skin, Body and Hair care

Recommended dosage
3.0%

Lipid Messenger
- Epidermal cells have receptors on S-1-P
- The signals that passed through S-1-P can reach the skin layer and give great effect

Functions
- Proliferation by mitogenic stimulation
- Differentiation of keratinocyte
- Survival from oxidative damage
- Wound healing from releasing S-1-P

But it gets reduced as we age

Replacement of S-1-P
- Similar structure as S-1-P
- Acts as a cell signaling agent for anti-aging
- More stable and soluble than S-1-P
- Provided with more affordable price as an analogue of S-1-P

Sigmedia
1. Sphingosine is phosphorylated by Sphingosine kinase to make S-1-P
2. S-1-P goes out of cell and binds to receptor
3. Cell activation is stimulated by signaling cascade
4. Activated cells affect skin layer for anti-aging

**Replacement of S-1-P**

**Signaling Pathway of S-1-P**

**Anti-wrinkle**

In-vivo

Lotion containing 3.0% of Sigmedia twice a day for 4 weeks with 10 volunteers

Detection method: Facial Analysis System

**Wound Healing Effect**

Migration assay

<table>
<thead>
<tr>
<th>Cell strain</th>
<th>Human epidermal Keratinocyte (C-001-5C, Cascade)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection method</td>
<td>Ibidi GmbH kit (Germany)</td>
</tr>
</tbody>
</table>

**Anti-scenesense Assay**

<table>
<thead>
<tr>
<th>Signaling</th>
<th>Function</th>
<th>Control</th>
<th>Sigmedia (0.03%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-ERK</td>
<td>Activated</td>
<td>X 10</td>
<td>X 100</td>
</tr>
<tr>
<td>p-p38</td>
<td>Activated</td>
<td>X 10</td>
<td>X 100</td>
</tr>
<tr>
<td>p-JNK</td>
<td>Inactivated</td>
<td>X 10</td>
<td>X 100</td>
</tr>
</tbody>
</table>

**Intracellular Signaling Assay**

<table>
<thead>
<tr>
<th>[min]</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-ERK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
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**Anti-wrinkle**

In-vivo

Lotion containing 3.0% of Sigmedia twice a day for 4 weeks with 10 volunteers

Detection method: Facial Analysis System

**Wound Healing Effect**

Migration assay

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<td>Inactivated</td>
<td>X 10</td>
<td>X 100</td>
</tr>
</tbody>
</table>
EDE-cide plus

Going green to preserve your formula

Unique blend of Artemisia princeps & Grapefruit seed extracts for anti-bacterial activity

<table>
<thead>
<tr>
<th>INCI</th>
<th>Physical form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octanediol, Ethylhexyl glycerin, Grapefruit seed extract, Artemisia princeps extract</td>
<td>Yellow transparent viscous liquid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits &amp; Uses</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-bacterial, Paraben free, Safe and nature friendly</td>
<td>Skin, Body, Sun and Hair care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended dosage</th>
<th>Formulation tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin softener, Toner, Essence : 0.4% Lotion, Cream, Emulsion : 0.6% Cleansing form : 0.45%</td>
<td>Add during water phase with 8% of Ethanol or 1.3-BG *No post-addition</td>
</tr>
</tbody>
</table>

A drop of Powerful EDE-cide plus protects your products effectively. It guarantees to keep away from bacteria.
**Powerful Anti-biotic Effect from Artemisia princeps**

The facts and usage of Artemisia princeps are recorded in medical history of ancestors.

**Chorak Island**

Perfect condition for growing Artemisia princeps with fertile soil, sunlight and ocean breeze.

**Unique blend of Hydrophilic & Lipophilic**

made by hydrophilic & lipophilic process to increase safety and efficacy.

**Anti-microbial Effectiveness Test**

Test demonstrates the effectiveness of anti-microbial protection in cosmetics.

**VS 1,2-Hexanediol**

0.6% EDE-cide plus VS 2.0% 1,2-Hexanediol

**Cutaneous Tolerance Patch Test**

Result from the certified organization, ELLEAD Co. Ltd.

**Actual Study Dates**

August 31, 2010 ~ September 3, 2010

**Test Product**

EDE-cide plus

**Subjects**

Healthy 30 females

**Age**

27~53(41 as average)
Fermentoil Series

Olive / Argan / Green tea seed
New generation of plant oil to improve your cosmetics

Creating new category of plant oil through the exclusive oil fermentation technology to enhance higher beneficial free fatty acids values, improved skin absorption and emulsifying capacity

<table>
<thead>
<tr>
<th>INCI</th>
<th>Benefits &amp; Uses</th>
<th>Application</th>
<th>Recommended dosage</th>
</tr>
</thead>
</table>
| Fermentoil Olive  
Pseudozyma epicola/soybean flour/olive fruit oil ferment filtrate | Non-greasy feeling  
Improved skin absorption  
Improved emulsifying capacity  
Improved compatibility  
Increased beneficial free fatty acid value | Skin, Body, Sun and Hair care | Up to 99%, depending on formulation |
| Fermentoil Argan  
Pseudozyma epicola/soybean flour/argania spinosa kernel oil ferment filtrate | | | |
| Fermentoil Green tea seed  
Pseudozyma epicola/camellia sinensis seed oil/glucose/glycine soja (soybean) meal/malt extract/yeast extract ferment filtrate | | | |

Fermentation Process of Fermentoil

TRIGLYCERIDE

ATTACK POINT

FATTY ACID

ANABOLISM

CATABOLISM

LINOLEIC ACID

LINOLENIC ACID

PSEUDOZYMMA.sp.  
SY-16[KCTC 8850P]

GLYCEROL

“FREE” FATTY ACID

KR Patent / PCT Pending
**Fermentoil Series**

**Olive oil**
- Moisturizing
- Antioxidant activity
- Protection against UVB damage
- Anti-inflammation

**Argan oil**
- Moisturizing
- Anti-sebum
- Anti-aging
- Wound healing
- Anti-acne

**Green tea seed oil**
- Moisturizing
- Antioxidant activity
- Antiseptic
- Fungicide and bactericide

---

**Improved Application in cosmetics**

- Non-greasy feeling
- Improved skin absorption
- Improved emulsifying capacity
- Improved compatibility
- Increased beneficial free fatty acid value

---

**Detection method**

**2D-TLC Analysis**

- **Olive oil**
  - Linoleic acid: 0
  - Palmitic acid: 0
  - Oleic acid: 374.4
  - Stearic acid: 0

- **Fermentoil Olive**
  - Linoleic acid: 5978.3
  - Palmitic acid: 4740.7
  - Oleic acid: 27457.0
  - Stearic acid: 1668.3
  - Unit: ppm

---

**HPLC Analysis**

- **Argan oil**
  - Linoleic acid: 1240.3
  - Palmitic acid: 378.7
  - Oleic acid: 1160.6
  - Stearic acid: 262.7

- **Fermentoil Argan**
  - Linoleic acid: 16926.3
  - Palmitic acid: 5628
  - Oleic acid: 21053.3
  - Stearic acid: 1549
  - Unit: ppm

---

**Analysis of Free fatty acid Value**

<table>
<thead>
<tr>
<th>pH9.0</th>
<th>pH7.0</th>
<th>pH5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olive oil</td>
<td>Fermentoil Olive</td>
<td>Fermentoil Olive</td>
</tr>
<tr>
<td>Fermentoil Olive</td>
<td>Argan oil</td>
<td>Fermentoil Argan</td>
</tr>
<tr>
<td>pH9.0</td>
<td>pH7.0</td>
<td>pH5.0</td>
</tr>
</tbody>
</table>

**Improved Emulsifying Capacity**
# Korean Medicinal Herb Fermentoil Series

New generation of plant oil to improve your cosmetics

Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb

<table>
<thead>
<tr>
<th>Product name</th>
<th>INCI name</th>
<th>Benefits &amp; Uses</th>
<th>Recommended Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fermentoil Angelica</td>
<td>(Pending) Pseudozyma epicola/soybean flour / olive fruit oil / angelica gigas root extract ferment filtrate</td>
<td>- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb</td>
<td>Up to 99%, depending on formulation</td>
</tr>
<tr>
<td>Fermentoil Artemisia</td>
<td>(Pending) Pseudozyma epicola/soybean flour / olive fruit oil / angelica gigas root extract ferment filtrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fermentoil Red ginseng</td>
<td>(Pending) Pseudozyma epicola/soybean flour / olive fruit oil / panax ginseng root extract ferment filtrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fermentoil Glycyrrhiza</td>
<td>(Pending) Pseudozyma epicola/soybean flour / olive fruit oil / glycyrrhiza uralensis (licorice) root extract ferment filtrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fermentoil Leonurus</td>
<td>(Pending) Pseudozyma epicola/soybean flour / olive fruit oil / leonurus sibiricus extract ferment filtrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fermentoil Saururus</td>
<td>(Pending) Pseudozyma epicola/soybean flour / olive fruit oil / saururus chinensis extract ferment filtrate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New generation of cosmetic oil

Choosing the right oil can make a difference in your formulation

Creating new category of oil through unique fermentation technology
**Olive oil**
- Moisturizing
- Antioxidation activity
- Protection against UVB damage
- Anti-inflammation

Korean medicinal herb + DAMY Fermentation

### Korean Medicinal Herb Fermentoil Series

<table>
<thead>
<tr>
<th>Name</th>
<th>History</th>
<th>Medicinal active ingredient</th>
<th>Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Angelica gigas</em></td>
<td><em>“Husband comes back home”</em> • Used as a medicine for more than 2000 years • Nourishing of the blood*</td>
<td>Decursin Decursinol Angelate Nodakenin Isoimperatorin Polyacltylene</td>
<td>Anti-wrinkle • Anti-oxidation • Anti-inflammation • Anti-microbes • Moisturizing</td>
</tr>
<tr>
<td><em>Artemisia princeps</em></td>
<td><em>Described in the myth of the Dangun</em> • Mentioned more than 500 times as prescription in Dong-eui-bo-gam* • Improvement of the function of the liver and kidney*</td>
<td>Polyphenol Flavonoid</td>
<td>Anti-microbes • Anti-inflammation • Anti-oxidation • Brightening</td>
</tr>
<tr>
<td><em>Panax ginseng</em></td>
<td><em>Has been produced for about 1000 years</em> • Recovering one’s energy*</td>
<td>Ginsenoside Rg1 Ginsenoside Rb1</td>
<td>Wound healing • Anti-inflammation • Collagen synthesis</td>
</tr>
<tr>
<td><em>Glycyrrhiza uralensis</em></td>
<td><em>Promotion of blood circulation, detoxification</em></td>
<td>Glycyrrhizinate</td>
<td>Anti-oxidation • Anti-inflammation • Anti-irritation • Brightening</td>
</tr>
<tr>
<td><em>Leonurus sibiricus</em></td>
<td><em>“Good for mother”</em> • Wu Tse-t’ien, the first woman emperor of China used it for beauty • Using before and after pregnancy*</td>
<td>Leonurine Vitamin A</td>
<td>Anti-oxidation • Anti-aging</td>
</tr>
<tr>
<td><em>Saururus chinensis</em></td>
<td><em>Native plant only grown in Jeju island</em></td>
<td>Quercetin Quercitrin Methyl-n-nonyl-ketone</td>
<td>Anti-oxidation • Brightening</td>
</tr>
</tbody>
</table>

*Described by Dong-eui-bo-gam (東醫寶鑑), a Korean traditional medicinal manual which was designated as heritage in UNESCO of the world. It is written by Heo Jun, a royal physician of the 17th century.*
Welcome to our web site
www.damychem.com