Innovative formulation of Ceramide

Ceramide3B Series

By using clearly solubilized ceramide, it helps to arrange of the lipids in stratum corneum
This is the key to form the skin barrier

Now, You can feel the real ceramide
The protection of the skin is provided primarily by the outermost layer of the epidermis – the stratum corneum.
The major lipid classes in the stratum corneum are Ceramides, cholesterol and fatty acids.

**Skin barrier lipid consists**

40~50% of Ceramide

Composition of Skin Lipids

- **Ceramide**: 40~50%
- **Free fatty acids**: 25%
- **Cholesterol**: 30%
- **Cholesteryl Sulphate**: 5%

**Skin barrier lipid consists**

40~50% of Ceramide
### Aging & Ceramide level

<table>
<thead>
<tr>
<th>Age</th>
<th>Ceramide level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hands</strong></td>
<td></td>
</tr>
<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><strong>Face</strong></td>
<td></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>


**Skin ceramide level decreases rapidly with age**

**Test design**

Comparison of Ceramide content and profile of normal (39 volunteers) and dry skin conditions (25 volunteers).


In dry skin, the total ceramide content is decreasing
In dry skin, there is a deficiency in phytosphingosine based ceramides
As ceramide crystalizes easily, it is usually unstable in liquid phase.
Ceramide has been using in the form of emulsion and liposome type for maintaining its stability in the formulation, but Ceramide3B ST improves skin barrier function and skin feeling of ceramide through solubilization.
New BIO-surfactant, MEL

MEL (Mannosylerythritol Lipid)

Hydrophobic

Combines with Ceramide

Asymmetric structure

Prohibit Ceramides from crystalization

Key factor for solubilizing the ceramide, MEL
MEL is inserted in the lamella structure of ceramide and inhibits crystallization of ceramide.

In conclusion, MEL helps to solubilize ceramide.
Solubilization process doesn’t need high temperature.

Normal Solubilization

Solubilization with DAMY’s technology

High temperature
(150°C)

Not transparent
(Liposome type)

Low temperature
(80°C)

Transparent
(Smaller particle)
According to SEM, the morphology of Ceramide3B ST solution is in stable in sphere form.

Ceramide3B ST solution
(Containing 20% ceramide)
Case of Ceramide3B ST solution is stable according to measuring zeta potential
Ceramide3B ST is still in the form of liquid crystal after 1 month storage.

After 1 month storage
Ceramide3B ST solution
(Containing 20% ceramide)

After 1 month storage
Ceramide 20% solution

Ceramide3B ST is still in the form of liquid crystal after 1 month storage.
Toner or Cream?

**Cream**
- Rich cream containing high concentration of Ceramide through easy solubilizing process

**Toner**
- Transparent liquid formulation containing up to 0.05% of Ceramide
- Liquid formulation containing 0.5% of Ceramide with stability

Various options to apply Ceramide in formulation with wide range of different concentrations
Emulsion type vs Liposome type VS Ceramide3B Series

- Toner (Two layer/Milky) Essence Emulsion Cream Make-up
- Mist Toner Essence Emulsion Cream Make-up

Water

Lecithin
<table>
<thead>
<tr>
<th></th>
<th>Ceramide3B ST</th>
<th>Ceramide3B DP</th>
<th>Ceramide3B DPS (0.5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Water soluble ceramide3 in high transparency</td>
<td>Water and oil soluble ceramide3 in high transparency</td>
<td>5% of Ceramide3B DP in solution</td>
</tr>
<tr>
<td><strong>Ceramide3B Content</strong></td>
<td>20%</td>
<td>10%</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>INCI</strong></td>
<td>Glycolipids, Ceramide 3, Dipropylene glycol, Butylene glycol, 1,2-Hexanediol, Polysorbate 20, Glycerin, Stearoyl glutamic acid, Lauroyl glutamic acid</td>
<td>Candida bombicola/Glucose/Methyl Rapeseedate Ferment, Olea Europaea(Olive)Fruit Oil, Glycolipids, Ceteareth-20, PEG 40-Hydrogenated castor oil, Ceramide 3, Polysorbate 20, Cetearyl alcohol, Propanediol</td>
<td>Water, Butylene glycol, 1,2-Hexanediol, Pseudomycelia epicola/olive fruit oil ferment, Glycolipids, Ceteareth-20, Ceramide 3, PEG 60-Hydrogenated castor oil, PEG 40-Hydrogenated castor oil, Polysorbate 20, Cetearyl alcohol, Propanediol</td>
</tr>
<tr>
<td><strong>Physical form</strong></td>
<td>Paste</td>
<td>Paste</td>
<td>Colorless transparent liquid</td>
</tr>
<tr>
<td><strong>Recommended dosage</strong></td>
<td>2.0~3.0%</td>
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</table>

**Benefits & Uses**
- Skin barrier enhancement, Anti-aging, Skin rejuvenation
- Elasticity enhancement, Moisturizing

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