
Pellicer™

Multifunctional cosmetic ingredient

# Pellicer™

Skin Care

Hair Care

*Pellicer™ repairs roughened skin and damaged hair,*
*through its natural affinity with their constituents as an amphiphilic*
*produced from natural plant components - fatty acids*
*and the amino acids glutamic acid and lysine.*

Contents

# Functions and effects of Pellicer™

## Skin care

Regulates and repairs the lamellar liquid crystal structure of roughened skin.

## Skin penetration enhancer effect
of water-soluble ingredient

Enhances penetration of water-soluble active ingredients without roughing up the skin.

## Emulsifying function

Emulsifies all kinds of oils at solid content of 0.1% for light, fresh finish.

## Pigment dispersing function

Disperses stably hydrophobic pigments in aqueous phase, enabling highly water-resistant oil-in-water formulations with fresh and light feeling.

## Oil gelling function

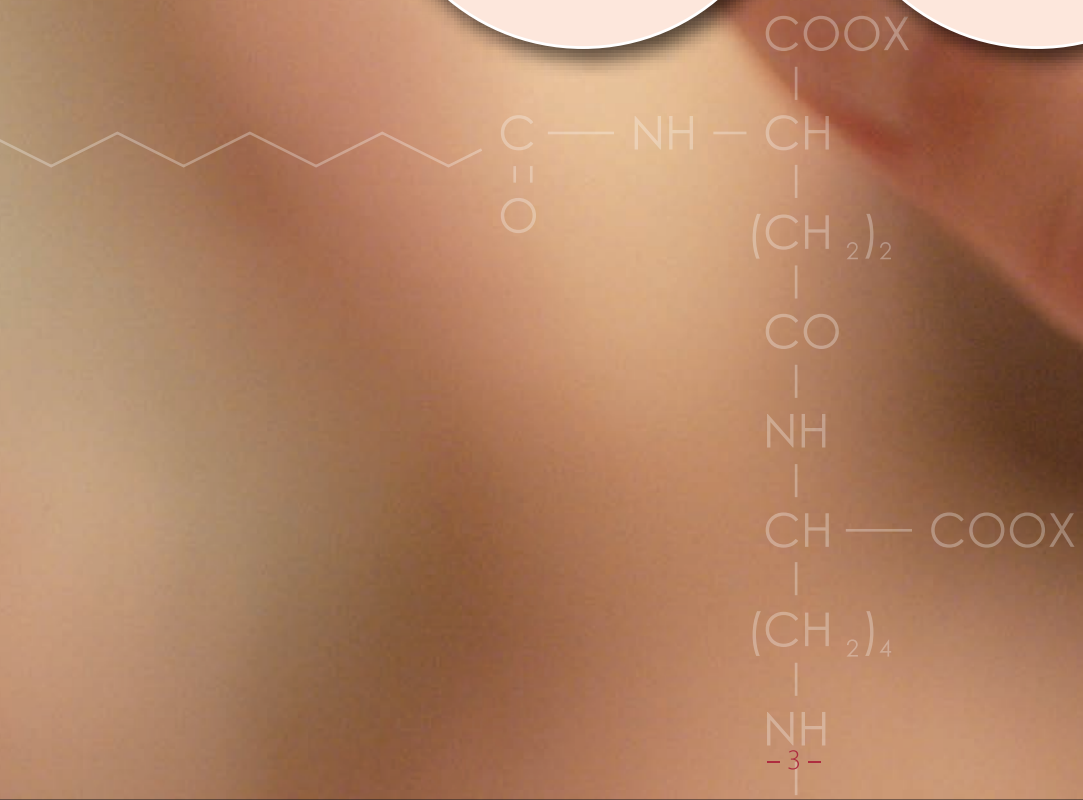
Gels various types of oils, making oil gels with smooth and less of a tacky feel.

## Solubilizing function

As a solubilizing aid, dramatically reduces the amount of nonionic surfactant for less of a tacky feel.

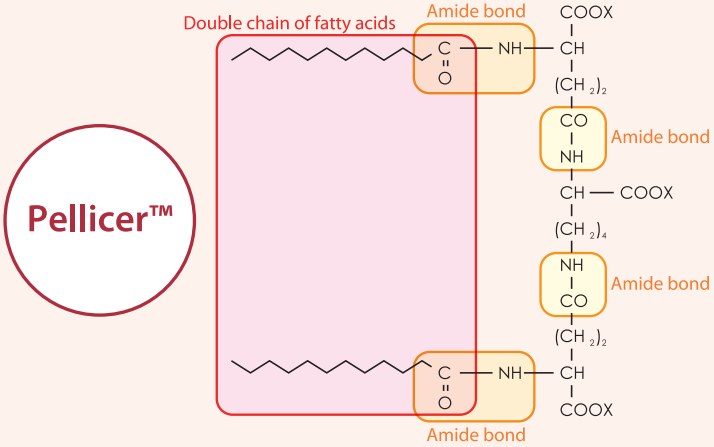
## Hair care

Promotes moisture penetration into hair, repairs damaged internal structure, improves damaged hair strength.

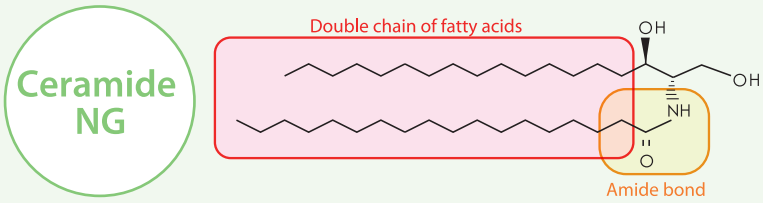


# Product features and applications of Pellicer™

## Pellicer™ with structure similar to Ceramide

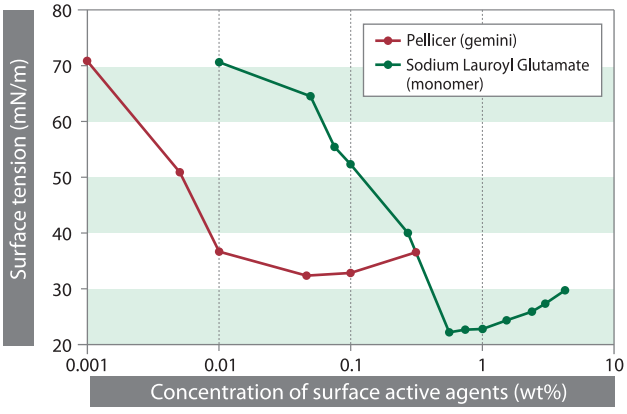



Pellicer™'s **amide bonds** and carboxylic acid are compatible with proteins, while **double-chain lipophilic group** is compatible with lipids. Pellicer™ therefore has a high affinity for skin and hair and has a damage repair function.

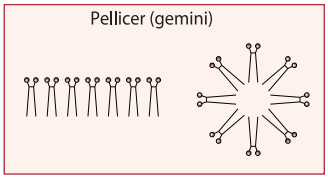


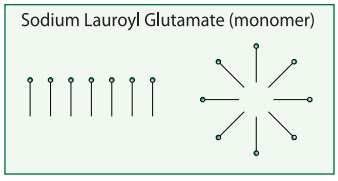

Has a structure similar to Ceramide, with a better penetration ability.

## Pellicer™, a gemini-type emulsifier that formulates micelles in a very small amount




Pellicer™ is a 100% naturally derived, gemini-type emulsifier. It can form micelles at low concentrations as shown in the graph on the left, can emulsify and gel a variety of oils in small amounts.




## Examples of use applications

| Category | Recommended amount (solid content) | Use applications |
|---|---|---|
| Skin care | 0.1% ~ 1.0% | Lotion, emulsion, cream, serum, face wash, bar soap, body shampoo, etc. |
| Emulsification | 0.03% ~ 0.1% | Emulsion for various hair and skin care products, sunscreen |
| Hair care | 0.01% ~ 0.1% | Shampoo, conditioner, hair tonic, etc. |
| Solubilization | 0.05% ~ 0.1% | Solubilization of fat-soluble vitamins and essential oils, etc. |
| Oil gel | 0.3% | Make-up remover and various types of oil gel formulations |

## Excellent properties of Pellicer™

**Excellent thermal stability**

**Excellent stability over time**

**Excellent biodegradability**

## Product information

| Product name | | Pellicer™ L-30 | Pellicer™ LB-30G | Pellicer™ LB-10 |
|---|---|---|---|---|
| Japanese labeling name (Concentration %) | | ジラウロイルグルタミン酸リシンNa (29%)<br>水 (71%) | ジラウロイルグルタミン酸リシンNa (27%)<br>BG (6%)<br>水 (67%) | ジラウロイルグルタミン酸リシンNa (10%)<br>BG (10%)<br>水 (80%) |
| INCI name (Concentration %) | English | Sodium Dilauramidoglutamide Lysine (29%)<br>Water (71%) | Sodium Dilauramidoglutamide Lysine (27%)<br>Butylene Glycol (6%)<br>Water (67%) | Sodium Dilauramidoglutamide Lysine (10%)<br>Butylene Glycol (10%)<br>Water (80%) |
| | Chinese | 水、二（月桂酰胺谷氨酰胺）赖氨酸钠 | 水、二（月桂酰胺谷氨酰胺）赖氨酸钠、丁二醇 | 水、二（月桂酰胺谷氨酰胺）赖氨酸钠、丁二醇 |
| Packaging | | 18kg can, 1kg can | 18kg can | 18kg can, 1kg can |

## Regulatory correspondence status

| Region | Regulations | Status as of September, 2020 |
|---|---|---|
| EU | REACH | Registered. Tonnage band: 1 – 10 t/y. |
| CHINA | IECSC | Permission on importation granted under "low volume exemption" scheme. Tonnage band: 1t as solid/y *3 importers = Less than 3 t/y. |
| | NMPA (former CFDA) | Listed on the Inventory of Existing Cosmetic Ingredient in China, published on June 30, 2014. |
| US | TSCA | Registered. |
| CANADA | NSNR (New Substance Notification Regulation) | Listed on NDSL (Non Domestic Substance List).<br>Annual tonnage band is not more than 1t as solid per importer. |
| AUSTRALIA | AICS (Australian Inventory of Chemical Substances) | Listed on NICNS (National Industrial Chemicals Notification and Assessment Scheme). |
| SWISS | ChemG | Registered. Tonnage band: 1 – 10 t/y. |
| JAPAN | JSQI (Japanese Standards for Quasi-drug Ingredients) | Registered. Category : "Medicinal cosmetics", "Perming agent" "Hair-coloring agent", "Hair growth tonic" and "medicinal toothpaste". Maximum dosage allowed: 0.35% as L-30. |

# SkinCare

Skin care function

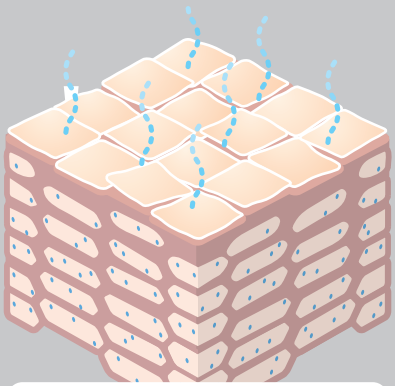
Restoration of lamellar structure

Improvement of rough skin texture

## Skin care function

***Pellicer™ penetrates into the stratum corneum and regulates the lamellar structure, leading to healthier skin***

### Rough skin condition



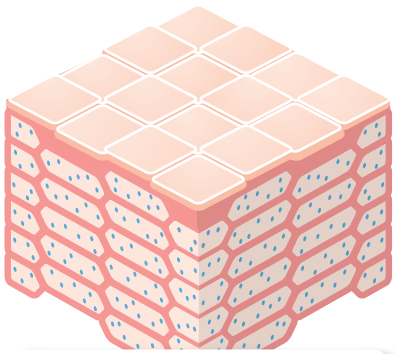
Skin hydration level is noticeably decreased in rough skin

Rough, dry appearance, low lipid and water content, low barrier protection.

| Composition of intercellular lipids | |
|---|---|
| Ceramide | 55% |
| Cholesterol | 25% |
| Fatty acid | 20% |

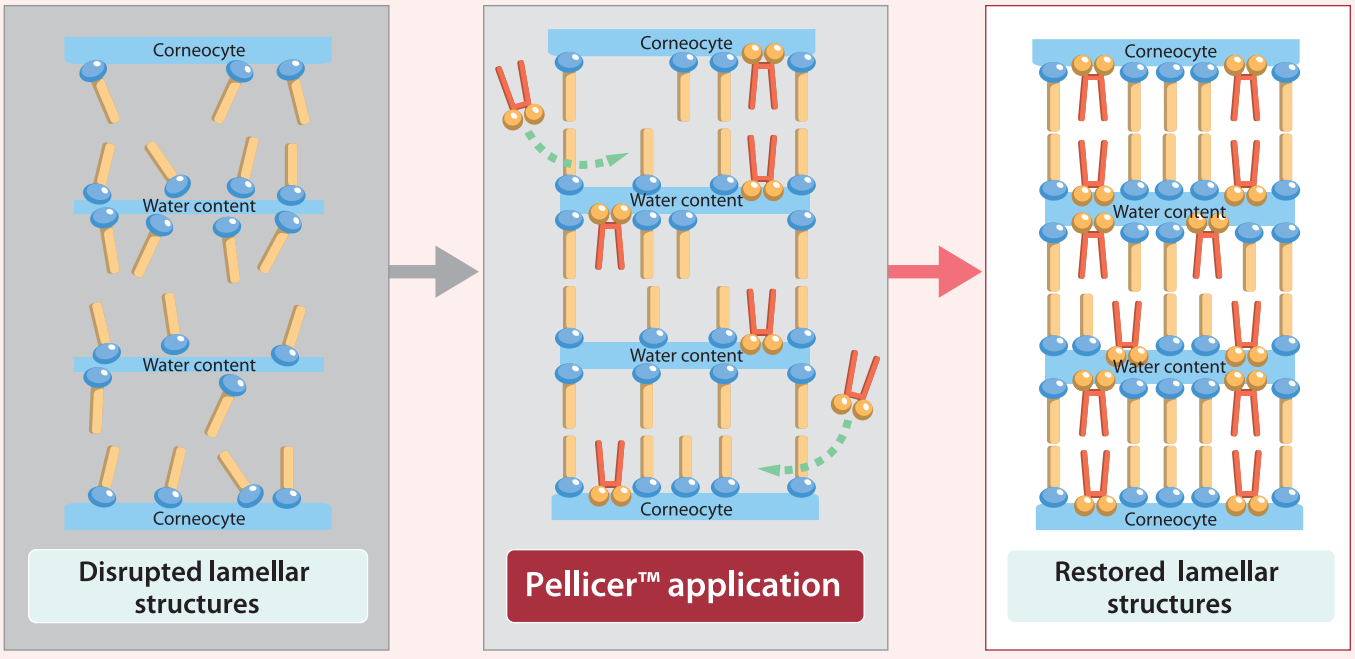
**Pellicer™ application**

### For healthy skin condition



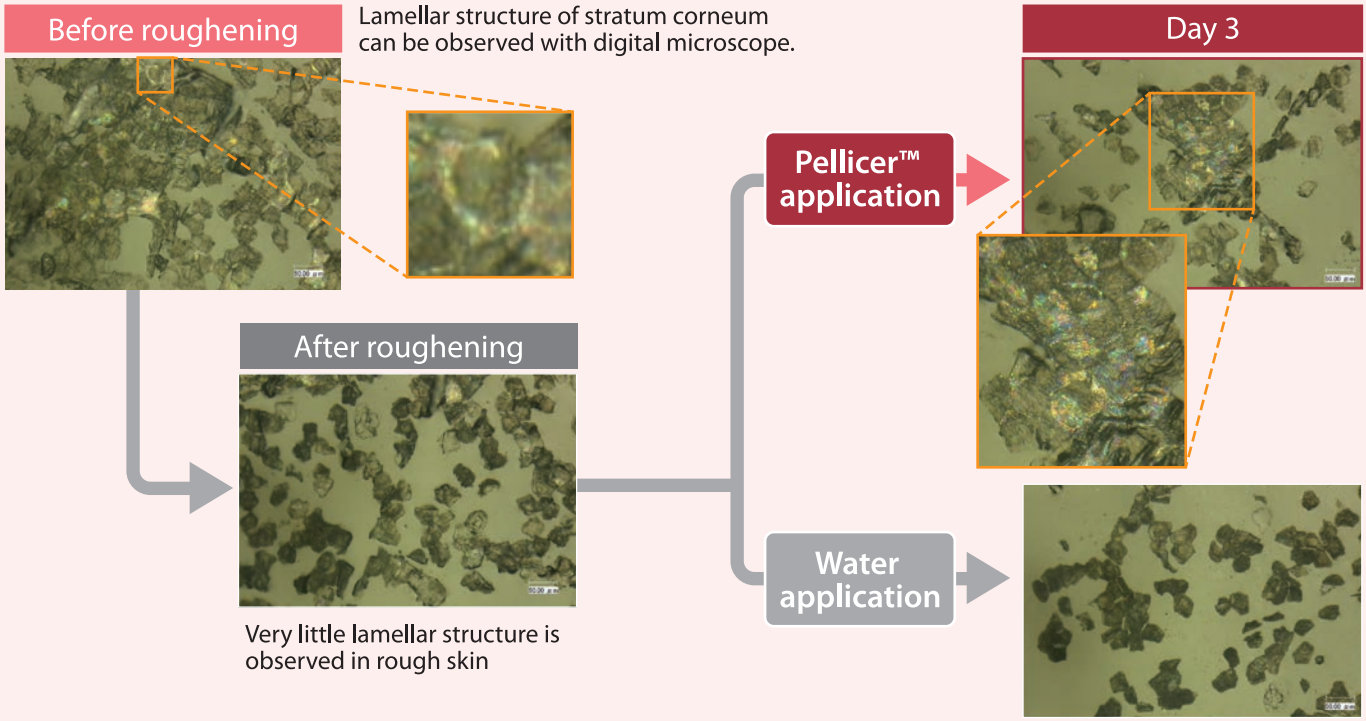
Intercellular lipids serve as mortar

Restoration of liquid-crystalline matrix, water retention, and barrier protection.



# Restoration of lamellar structures

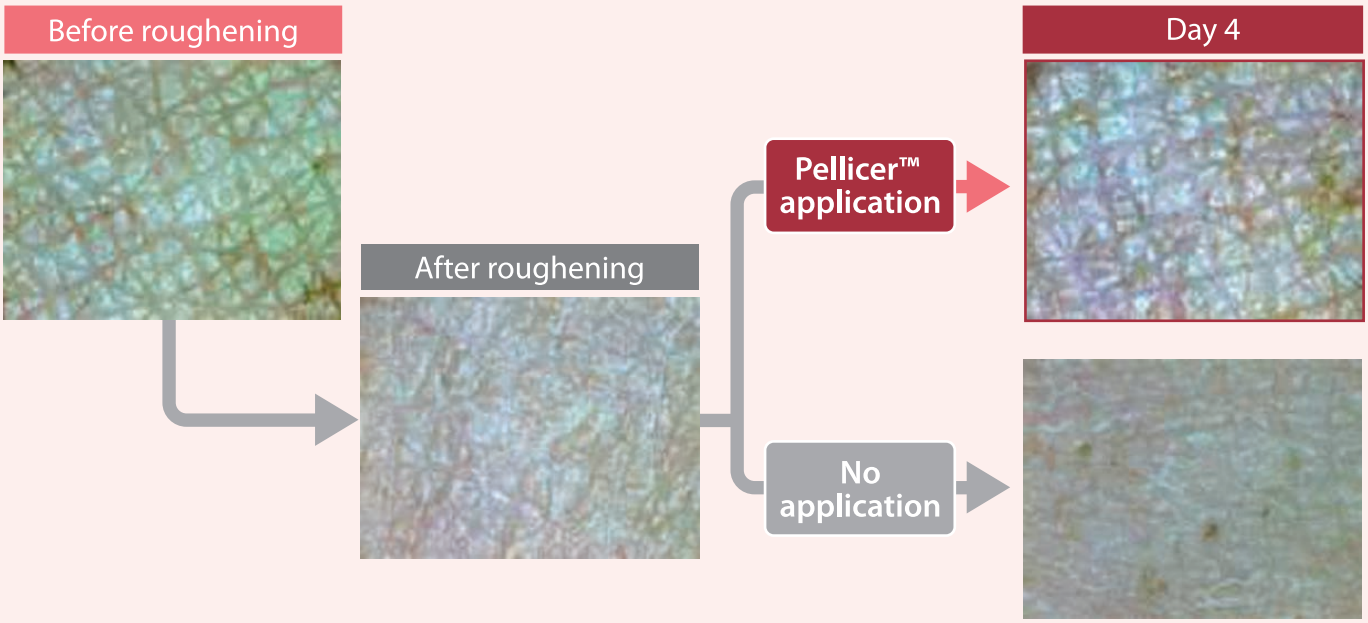
## *Pellicer™ penetrates the stratum corneum and restores the lamellar structure of intercellular lipids in just 3 days*




| Test method | ■ After having the skin roughened (by applying SDS 10%), apply 0.72% Pellicer™ solution twice a day (application amount of 2μL/cm2) and observe with 500 x microscope. |
|---|---|

# Improvement of rough skin texture

## *Pellicer™ has restored texture of rough skin in just 4 days*




| Test method | ■ After having the skin roughened (by applying SDS 5%), applied 1% Pellicer™ solution twice a day and observed with 50 x microscope. |
|---|---|

# SkinCare

Recovery of barrier function of rough skin

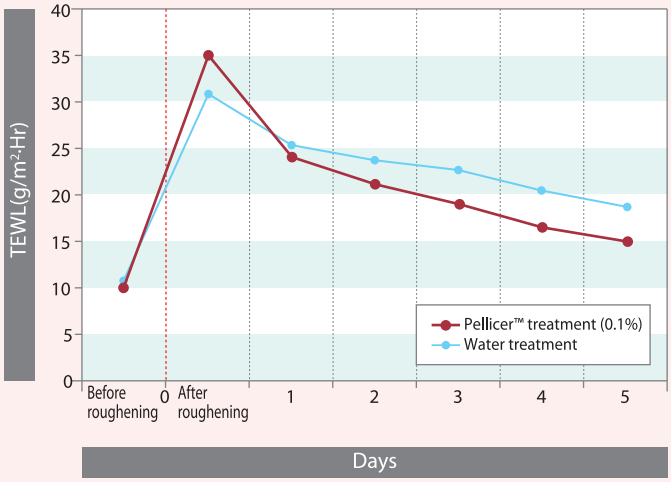
Comparison in permeability with Ceramide

Skin penetration enhancer effect of water-soluble active ingredients

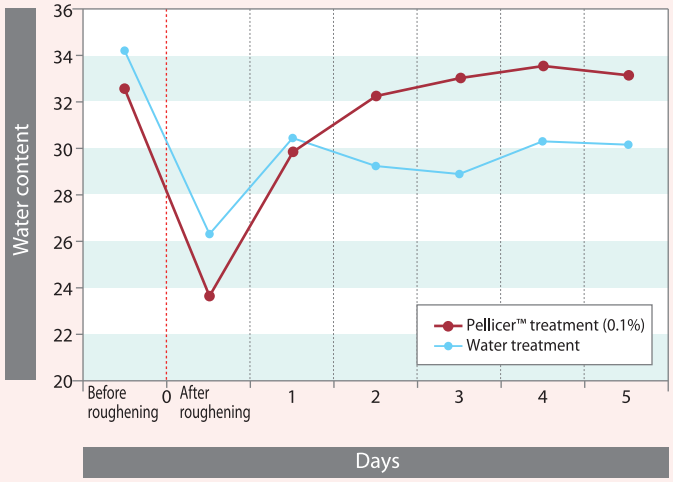
## Recovery of barrier function of rough skin

### *Pellicer™ cures rough skin, restoring barrier function and moisture content in stratum corneum*

Transepidermal water loss (TEWL)




Stratum corneum water content

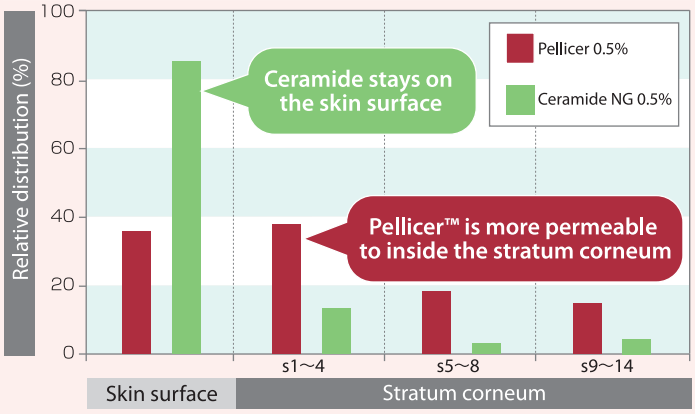



| Test method | ■ After having skin roughened (by applying 33% Potassium Cocoate Solution), apply 0.1% Pellice™ solution twice a day and observe.<br>■ Application quantity: 2μL/cm2. CORNEOMETER CM825, TEWAMETER TM300 (Courage + Khazaka, Integral Corp.) |
|---|---|

## Comparison in permeability with Ceramide

### *Pellicer™ is more permeable to skin than Ceramide*

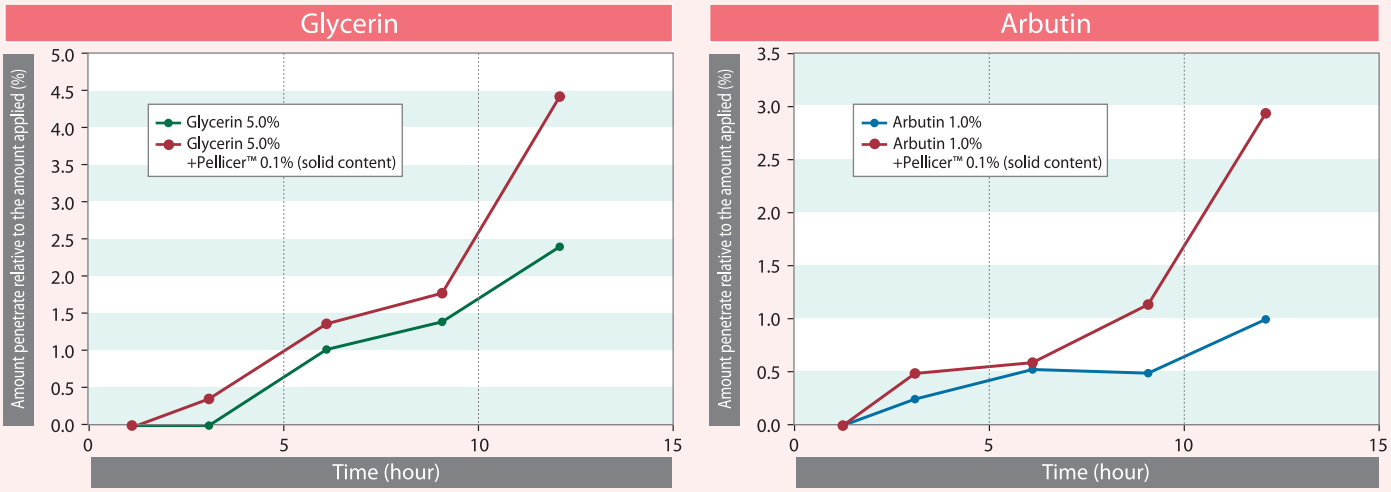
Permeability into stratum corneum (skin)




| Test method | ■ Pellicer™ or Ceramide (0.5% aqueous) applied on normal undamaged skin, followed by 14 successive skin surface removals with tape strips and HPLC to determine resulting quantity of applied substance on each tape strip. |
|---|---|

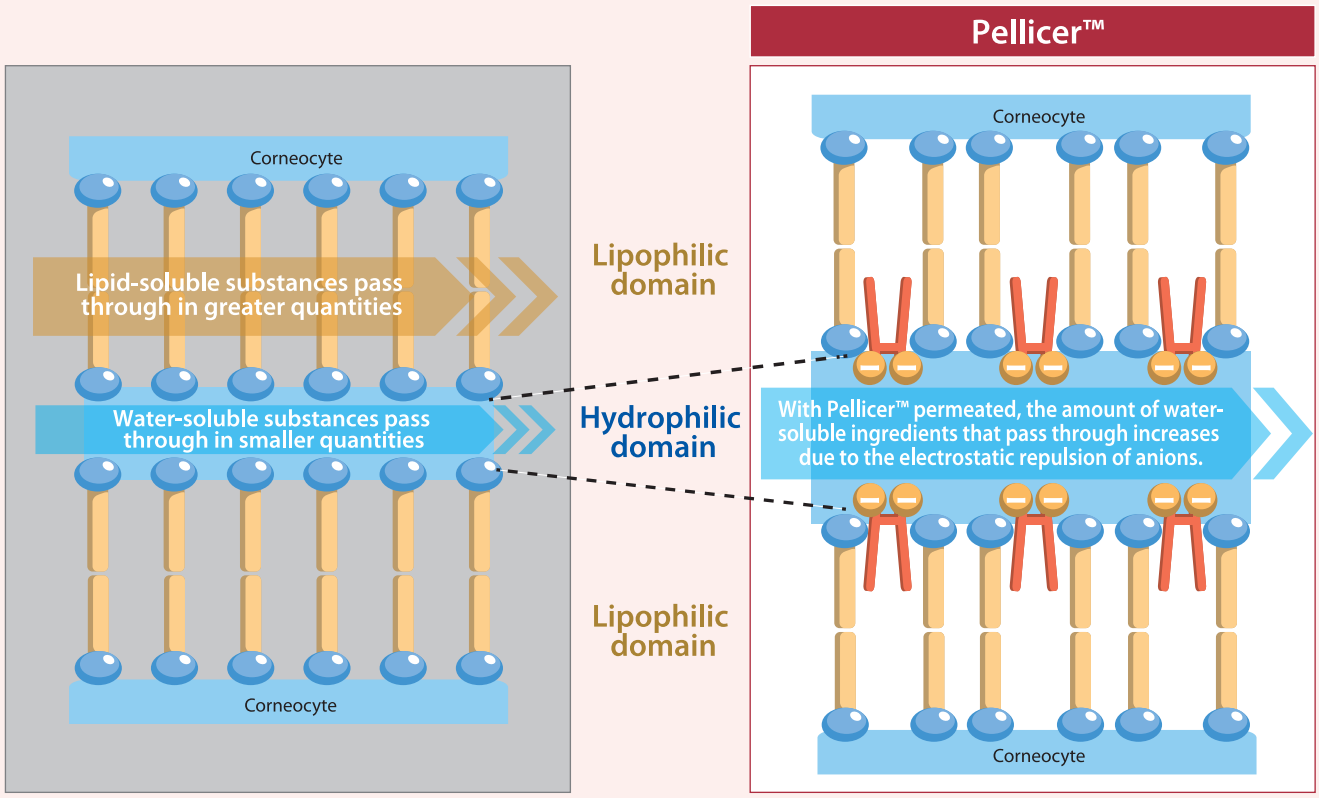
# Skin penetration enhancer effect of water-soluble active ingredients

## *Pellicer™ penetrates into skin, promoting penetration of water-soluble active ingredients*




| Test method | ■ By using 3-D cultured human epidermis model, compare the penetration amount of water-soluble active ingredients with and without Pellicer™. |
|---|---|

## 【Mechanism to promote penetration of water-soluble ingredient】




The lamellar structure of the stratum corneum of the skin is wider in the lipophilic domain and narrower in the hydrophilic domain, making it difficult for water-soluble ingredients to penetrate.

It is expected that with Pellicer™ permeated into the lamellar structure of the stratum corneum, the hydrophilic domain will be spread by electrostatic repulsion, promoting penetration of water-soluble ingredients.

Pellicer™

# Emulsifying function

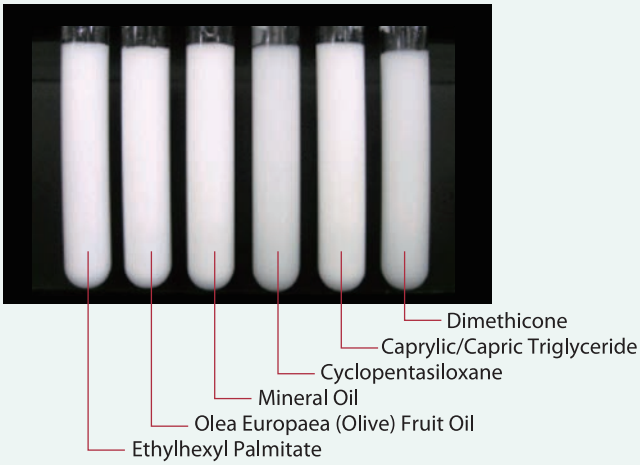
Ability to emulsify various types of oils

Use as a rescue co-emulsifier

## Ability to emulsify various oils

### *Pellicer™ can emulsify 20 % oils at 0.03%*

[50℃ × After 1 month]




【Formulation】

| Ingredients | Wt% |
|---|---|
| Pellicer™ L-30 (solid content) | 0.10 (0.03) |
| Oil | 20.00 |
| Carbomer (Carbopol 981) | 0.20 |
| 30w/v%NaOH aqueous solution | 0.28 |
| Water | 79.42 |

**Test method**

■ Dissolve Carbomer in water, and adjust the aqueous solution to pH 7 with NaOH aqueous solution.
■ Add Pellicer™ and oil, and emulsify with a homogenizer (6000 rpm) for 5 min at room temperature.

### *Pellicer™ alone can emulsify a wide range of oils from HLB 4 to 15*

【Assessment results】

| INCI name | Required HLB value * Representative value | Particle diameter (μm) | | Viscosity (m Pa·S) | |
|---|---|---|---|---|---|
| | | Oil content 10% | Oil content 50% | Oil content 10% | Oil content 5% |
| Triethylhexanoin | 4.0 | 7.0 | 4.6 | 1,190 | 3,910 |
| Olea Europaea (Olive) Fruit Oil | 7.0 | 13.8 | 6.9 | 1,270 | 4,700 |
| Cyclopentasiloxane | 7.5 | 8.5 | 6.9 | 1,220 | 3,910 |
| Ethylhexyl Palmitate | 8.0 | 8.3 | 5.4 | 1,260 | 4,370 |
| Mineral Oil | 10.0 | 11.3 | 7.3 | 1,250 | 4,310 |
| Dimethyl Phthalate | 15.0 | 1.0 | 1.1 | 1,090 | 2,370 |

* It may vary by the ingredients.

**Formulation**

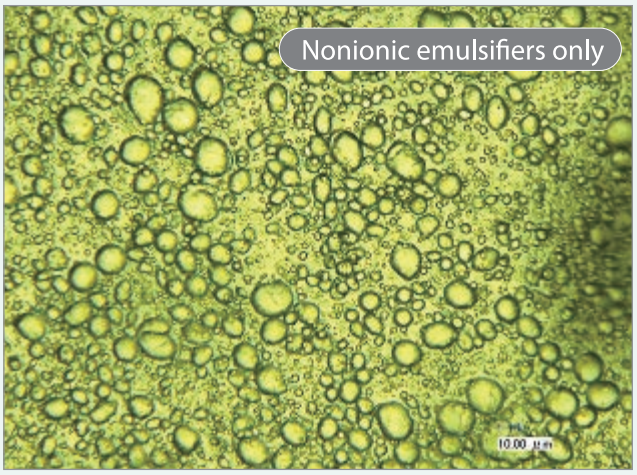
■ Oil phase: various types of oil (see above)
■ Aqueous phase: Pellicer™ LB-10(1%), 2% Carbopol 981 aqueous solution (10%), water (100% in total)

**Test method**

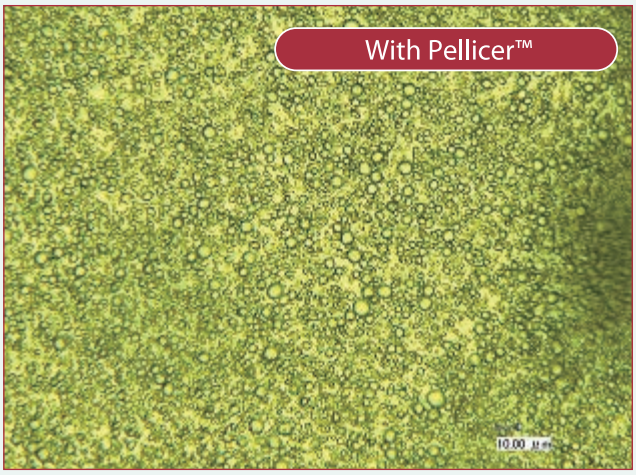
■ Adjust pH to 7.0 in the aqueous phase except Pellicer™ LB-10, and add Pellicer™ LB-10.
■ Heat the aqueous and oil phases to 80℃. Once the temperature reaches 80℃, slowly add the oil phase to the aqueous phase while stirring with a homogenizer (5000 rpm). When all is added, cool down to room temperature.

# Use as a rescue co-emulsifier

***Being used in combination with nonionic emulsifier, Pellicer™ makes the particle size of the emulsion finer, improving stability***




2.5 months at 50℃




2.5 months at 50℃

【Stability】

| | Nonionic emulsifiers (0.25%) <Unstable emulsion> | | Nonionic emulsifiers (0.25%) + Pellicer™ (solid content 0.1%) <Rescued by the combination with Pellicer™> | |
|---|---|---|---|---|
| | Immediately after manufacture | After 1 month at 50℃ | Immediately after manufacture | After 1 month at 50℃ |
| Appearance | Good | NG. Solid oil precipitated | Good | Good |
| Particle diameter (μm) | 9.3 | 9.7 | 4.6 | 3.5 |
| Viscosity (mPa·s) | 34000 | 28500 | 18000 | 20000 |

【Formulation】

| Phase | Ingredients | Nonionic emulsifiers only | With Pellicer™ used in combination |
|---|---|---|---|
| Oil | Glyceryl stearate | 0.10 | 0.10 |
| | Ceteth-20 | 0.10 | 0.10 |
| | Sorbeth-40 tetraoleate | 0.05 | 0.05 |
| | Triethylhexanoin | 7.00 | 7.00 |
| | Behenyl alcohol | 5.00 | 5.00 |
| | Ethylhexyl methoxysilicate | 6.00 | 6.00 |
| | Oxybenzone-3 | 2.00 | 2.00 |
| Aqueous | 【Pellicer™ LB-10】 Sodium Dilauramidoglutamide Lysine, BG, water | - | 1.00 (solid content 0.10) |
| | 2% Carbopol 981 aqueous solution (carbomer, water) | 15.00 (solid content 0.30) | 15.00 (solid content 0.30) |
| | Water | Remainder | Remainder |
| Neutralizer | Sodium Hydroxide (30w/v %) | 0.36 | 0.36 |

**Preparation procedure**

■ Heat aqueous and oil phases to 80˚C. Once the temperature reaches 80˚C, slowly add the oil phase to the aqueous phase while stirring with a homogenizer (5000 rpm). After stirring with the homogenizer (5000 rpm) for 5 minutes, cool it down to the room temperature and neutralize.

**Notes on Pellicer™ emulsification**

1. Pellicer™ emulsification requires a homogenizer.
2. Homogenize for 5 minutes at 5000rpm on a 200ml scale.
3. Add Pellicer™ into the aqueous phase.
4. Always add the oil phase to the aqueous phase during emulsification.
5. When creating a formulation that takes advantage of Pellicer's oil remaining property, using a low HLB emulsifier together can maintain that property.

Pellicer™

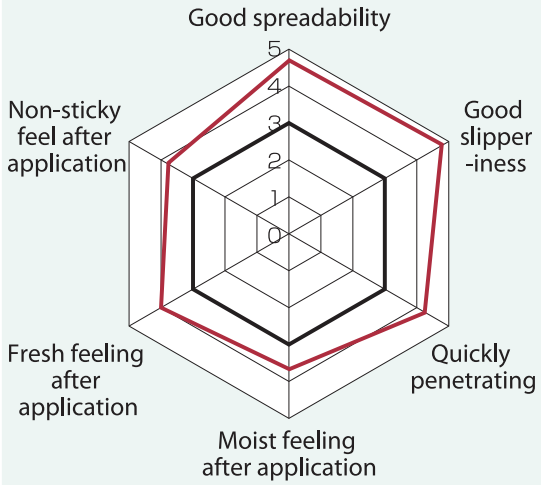
# Emulsifying function

**Pellicer™ emulsion with a fresh feel**

**Pellicer™ emulsion with water repellency while being Oil-in-Water(O/W).**

## Pellicer™ emulsion with a fresh feel

***Pellicer™ reduces the amount of emulsifier used to 1/10 or less of conventional products, greatly reducing stickiness***




| | Nonionic emulsifier (2.5%) | | Pellicer™(solid content 0.1%) | |
|---|---|---|---|---|
| | Immediately after manufacture | After 1-month at 50℃ | Immediately after manufacture | After 1-month at 50℃ |
| Appearance | Good | Good | Good | Good |
| Particle diameter (μm) | 2.4 | 2.1 | 14.3 | 13.4 |
| Viscosity (mPa·s) | 69500 | 31000 | 30200 | 32500 |

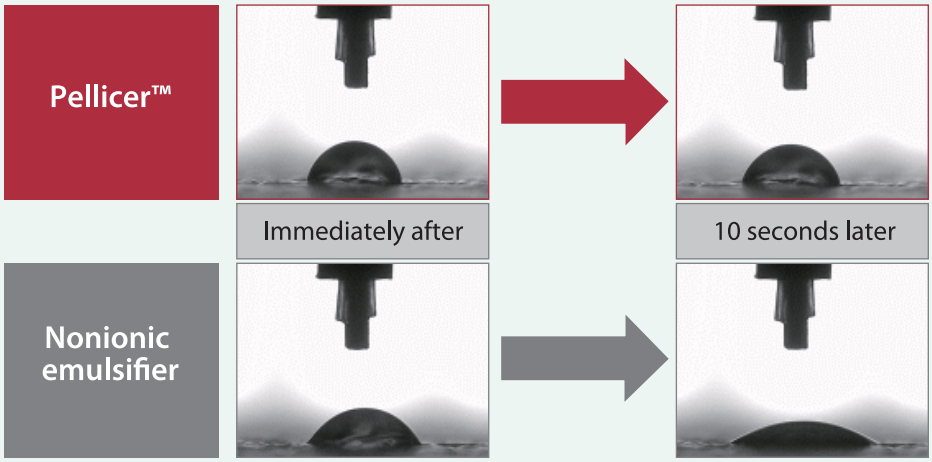
【Formulation】

| Phase | Ingredients | Nonionic emulsifier | Pellicer™ |
|---|---|---|---|
| Oil | Glyceryl Stearate | 1.00 | - |
| | Ceteth-20 | 1.00 | - |
| | Sorbeth-40 Tetraoleate | 0.50 | - |
| | Triethylhexanoin | 7.00 | 7.00 |
| | Behenyl Alcohol | 5.00 | 5.00 |
| | Ethylhexyl Methoxycinnamate | 6.00 | 6.00 |
| | Benzophenone-3 | 2.00 | 2.00 |
| Aqueous | 【Pellicer™ LB-10】 Sodium Dilauramidoglutamide Lysine, Butylene Glycol, Water | - | 1.00 (solid content 0.10) |
| | 2% Carbopol 981 aqueous solution (Carbomer, Water) | 15.00 (solid content 0.30) | 15.00 (solid content 0.30) |
| | Water | Remainder | Remainder |
| Neutralizer | Sodium Hydroxide (30w/v %) | 0.36 | 0.36 |

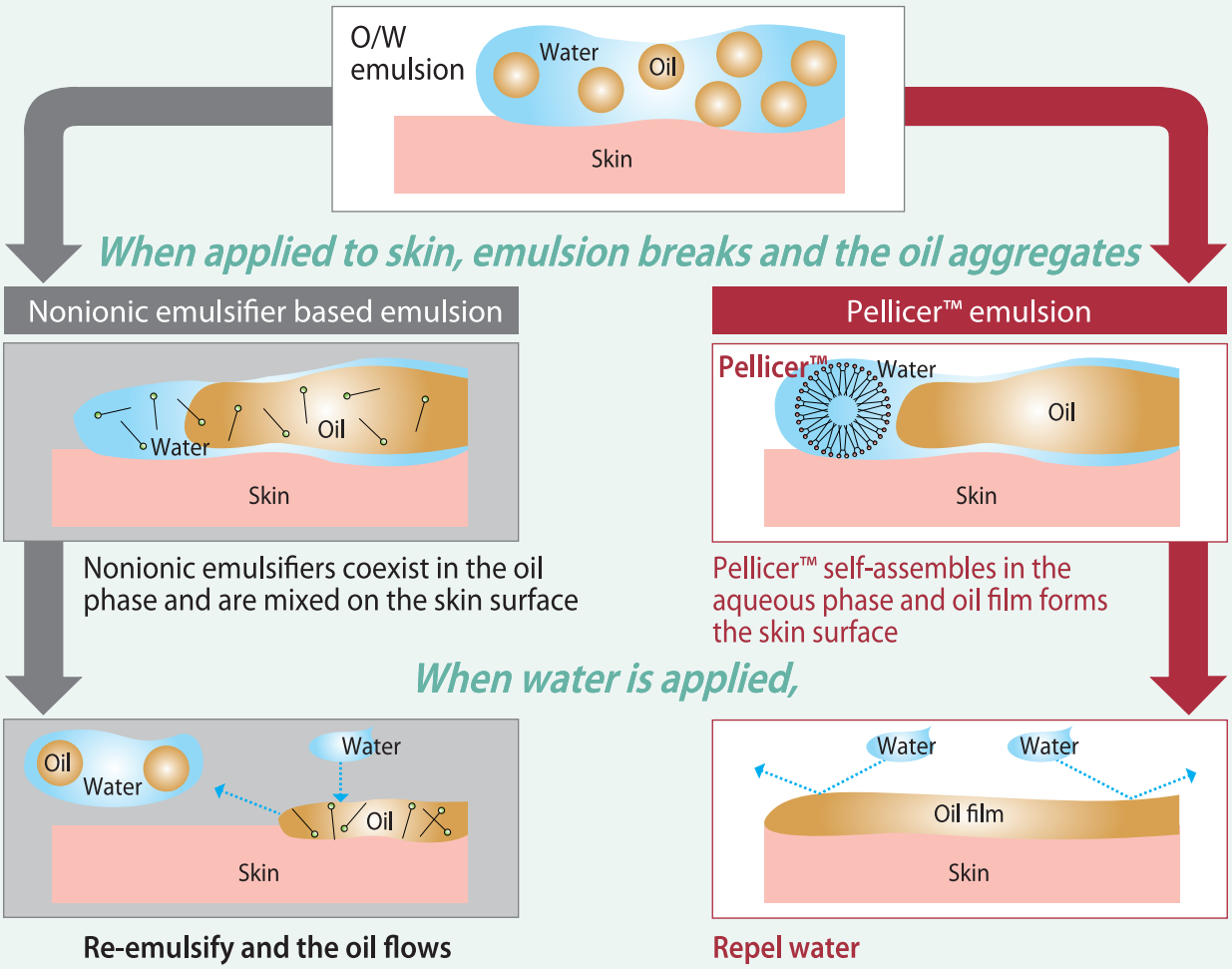
| Preparation procedure | ■ Heat aqueous and oil phases to 80˚C. Once the temperature reaches 80˚C, slowly add the oil phase to the aqueous phase while stirring with a homogenizer (5000 rpm).<br>■ After stirring with a homogenizer (5000 rpm) for 5 minutes, cool it down to the room temperature and neutralize. |
|---|---|

# Pellicer™ emulsion with water repellency while being O/W.

*Pellicer™ emulsion leaves oil film on the skin, making it O/W but water repellent.*




## [Mechanism ~ Water repellency (oil remaining property) of Pellicer™ emulsion ~]




- Pellicer™ tends to self-assemble, forming micelles in the aqueous phase when emulsion breaks after application to the skin surface.
- Pellicer™ needs homogenizer to work as emulsifier. Since there is no strong shear on skin, Pellicer™ doesn't re-emulsify. As a result, oil film forms on skin surface after rinse-off, demonstrating water repellency.

# HairCare

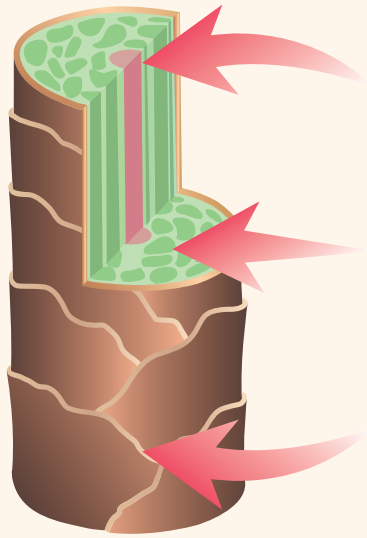
Mechanism of Pellicer™ effects

Permeability into hair

Repairability to the surface and inside of damaged hair

## Mechanism of Pellicer™ effects

*Pellicer™ works inside and on the surface of the hair to repair hair damage*



**■Damage repair by penetration of peptides**

Pellicer™, which has a tripeptide structure in its molecule, penetrates inside the cortex to repair damage.

**■Damage repair by penetration of moisture**

A total of seven amide bonds and carboxyl groups that are easily affinity with water promotes internal penetration of moisture, swells the cortex, and improves hair thickness.

For inner hair

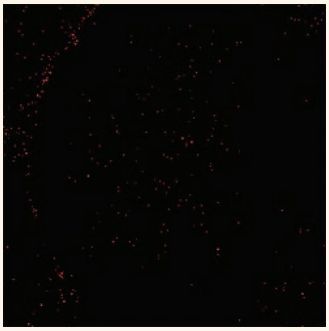
**■Damage repair by ceramide-like function**

Pellicer™, which has a structure similar to ceramide, improves the function of CMC (Cell Membrane Complex), cuticle lift and repairing cracks inside of the hair.

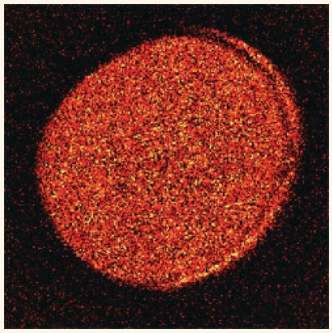
For hair surface

## Permeability into hair

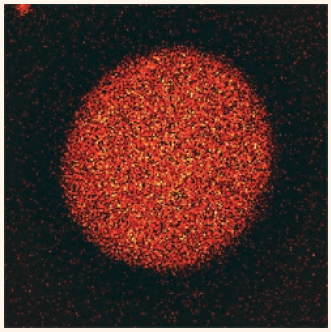
*Pellicer™ penetrates into the hair and persists after rinsing*



▲ Cross-section of damaged hair (*) before immersion



▲ After immersion in 0.1% Pellicer™ solution
Fast, full permeation



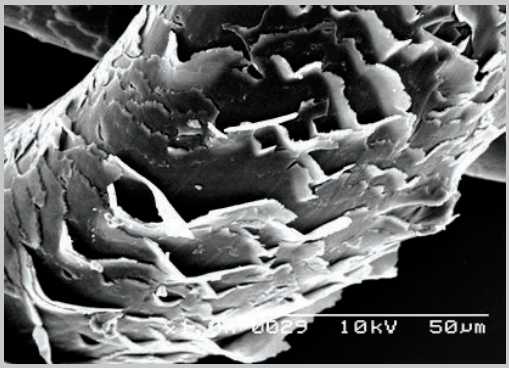
▲ After water rinsing
Long-lasting retention

| | |
|---|---|
| (*) Damaged hair | ■ Damaged hair was obtained by brushing 100 times after repeating perming and bleaching four times. |
| Test method | ■ Damaged hair (*) placed in 0.1% Pellicer™ solution for 1 minute, air dried, and rinsed in 40℃ water for 2 minutes. Cross-section analyzed for Pellicer™ distribution by Na+ TOF-SIMS before and after immersion and after 3 rinses. |

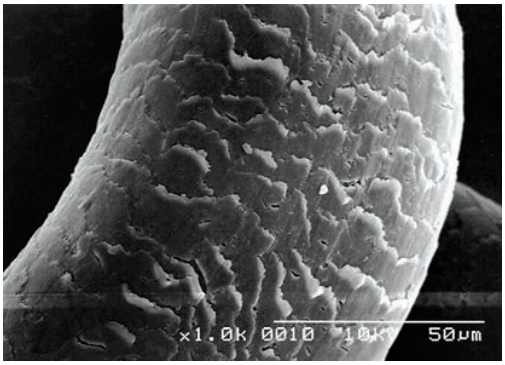
# Repairability to the surface and inside of damaged hair

## *Pellicer™ reduces cuticle lift and promotes recovery of a smooth, flat, lustrous cuticle array.*

(*) Damaged hair before immersion



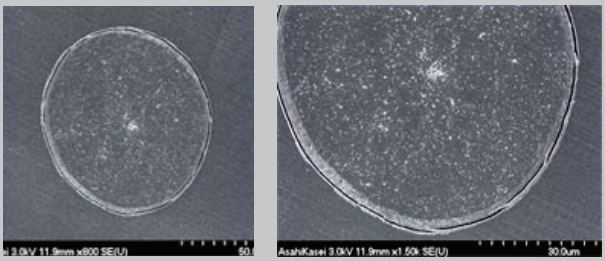

After immersion in 0.1% Pellicer™ solution



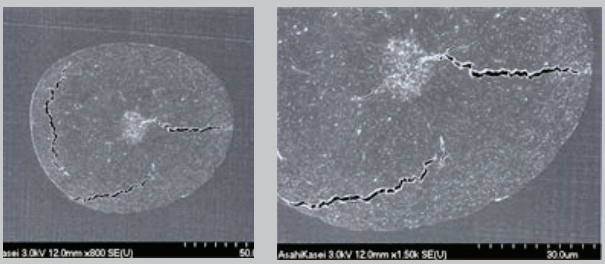

| Test method | ■Damaged hair(*) placed in 0.1% Pellicer™ solution for 1 minute, towel dried, air dried 1day at room temperature, brushed 100 strokes, then micrographed. |
|---|---|

## *Pellicer™ permeates the cortex and repairs the internal structure.*

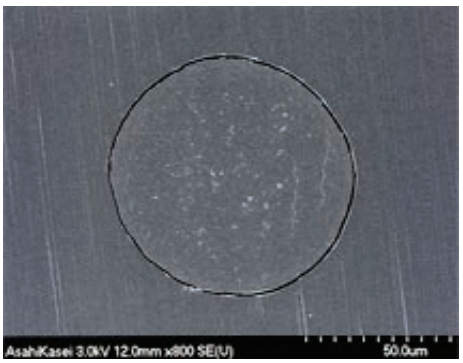
Normal healthy hair

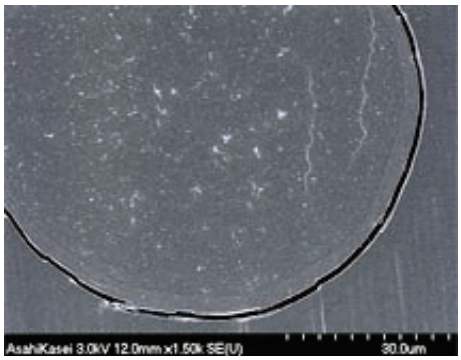


(*) Damaged hair before immersion



After immersion in 0.1% Pellicer™ solution




| Test method | ■ Damaged hair(*) placed in 0.1% Pellicer™ solution for 1 minute, towel dried, air dried 1day at room temperature, brushed 100 strokes, then observed. |
|---|---|

# HairCare

Break strength recovery

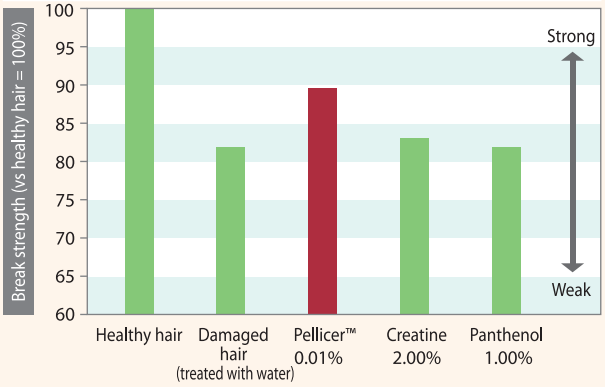
Recovery of smoothness and bound water content

## Break strength recovery

### *Pellicer™ improves tensile strength and resilience of damaged hair*

■ Break strength recovery (N=10)

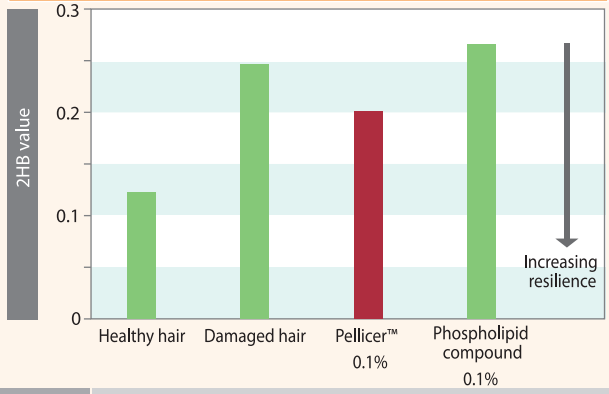
Results show Pellicer™ superior to other products




| | |
|---|---|
| Hair diameter measurement | ■ Equipment: SK-2000 Hair Diameter Measurement System<br>■ Measurement part: Cross-sectional area is calculated from the average of the short and long diameters measured at five equally spaced locations within a 40 mm hair fiber length. |
| Hair tensile test | ■ Equipment: RHEO METER CR-500DX-SII<br>■ Measured the yield point and tensile load. The value divided by cross-sectional area is assumed to be the tensile rupture strength. (Data values are relative to healthy hair) |

■ Resilience recovery

Results show good resilience recovery effect by Pellicer™



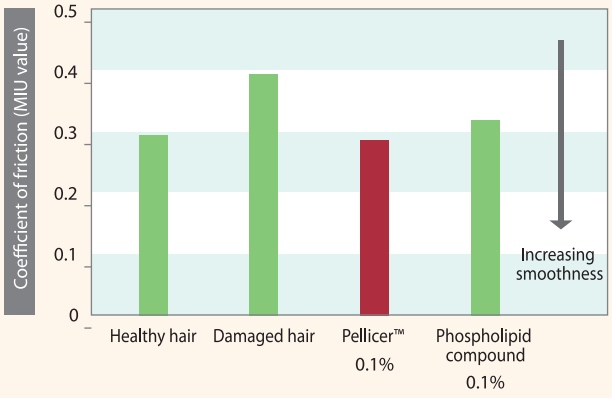

| | |
|---|---|
| Test conditions | ■ 32˚C, 44 - 46% RH ■ 200 hairs<br>■ Equipment: KatoTech KES-FB2 ■ Bending curvature: 1.0<br>■ Sample size: 2cm |

## Recovery of smoothness and bound water content

### *Pellicer™ improves smoothness of the hair surface and bound water content.*

■ Smoothness recovery

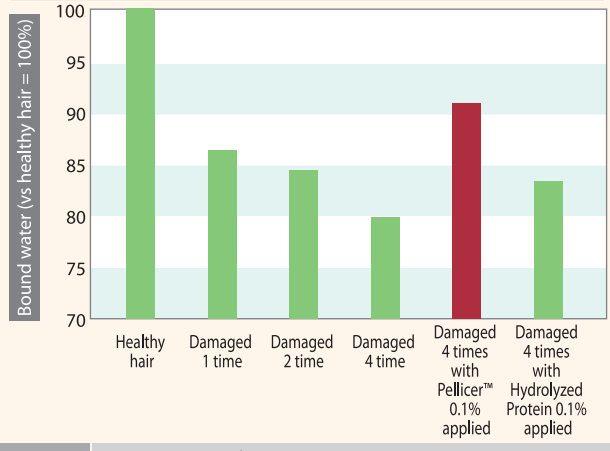
Results show high smoothness recovery effect by Pellicer™




| | |
|---|---|
| Test conditions | ■ 31-32˚C, 44 - 46% RH ■ 20 hairs<br>■ Equipment: KatoTech KES-SE ■ Speed: 1.0mm/sec.<br>■ Load: 25g ■ Sensor type: Silicone |

■ Bound water recovery

Results show good bound water recovery effect by Pellicer™




| | |
|---|---|
| Test method | ■ Hair is kept at 20˚C/84% for one day, and then about 0.3g of the test hair is set to the heating loss analyzer.<br>■ It is heated for 40 minutes at 65˚C, and then for 30 minutes at 180˚C to record the weight change over time during that period. |

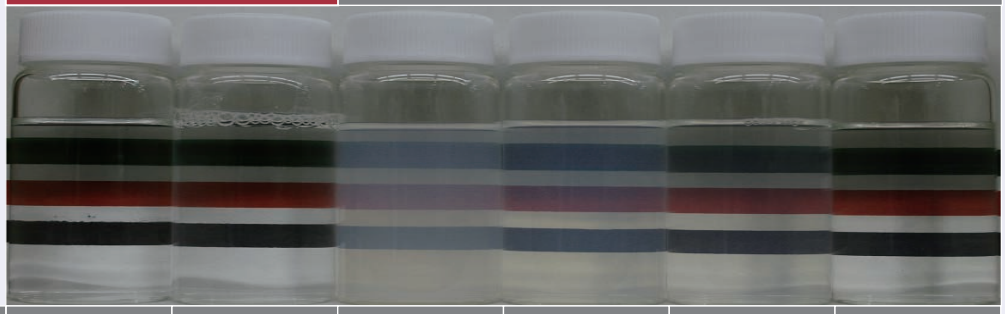
# Solubilizing function

Helps solubilize essential oils and fat-soluble vitamins

## Helps solubilize essential oils and fat-soluble vitamins

***Pellicer™ reduces the amount of solubilizers used to solubilize essential oils and fat-soluble vitamins, resulting in a less sticky feel.***

### [Solubilization of essential oils (lavender oil 0.1%)]




| Ingredients | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Pellicer™ (solid content) | 0.1 | | 0.0 | | | |
| Polyglyceryl-10 laurate | 0.75 | 0.5 | 3.0 | 5.0 | 7.0 | 10.0 |
| Lavender oil | 0.1 | | | | | |
| Water | Remainder | | | | | |

wt%

### [Solubilization of fat-soluble vitamins (tocopherol acetate 0.1%)]


| Ingredients | 1 | 2 | 3 |
|---|---|---|---|
| Pellicer™ (solid content) | 0.0 | 0.1 | 0.0 |
| Polyglyceryl-10 laurate | 5.0 | 2.0 | 10.0 |
| Tocopherol Acetate | 0.1 | 0.1 | 0.1 |
| Water | Remainder | Remainder | Remainder |

wt%

**Test method**

■ Mix various types of oils and solubilizing agents (including Pellicer™) and add water to the mixture (60℃, magnetic stirrers, 400-500rpm)

**Notes**

■ To further reduce the amount of solubilizers, use glycerin or BG in combination.
■ By using Pellicer™ with PEG-40 hydrogenated castor oil, it is capable of solubilizing 5 to 10% of fragrances.

# Oil gel function

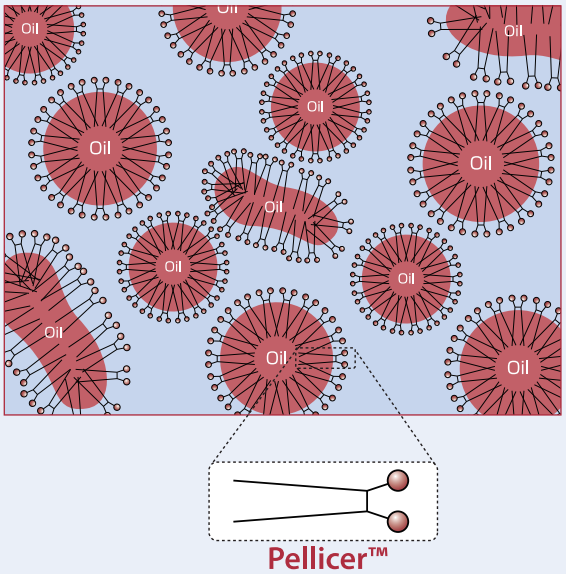
Features of Pellicer™ oil gel

Makeup removal ability of oil gel

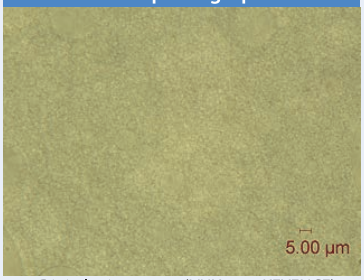
## Features of Pellicer™ oil gel

***Pellicer™ can gel a variety of oils.***

■ Schematic diagram of Pellicer™ oil gel (D-phase gel)




Microphotograph




Digital microscope (VHX-900: KEYENCE)

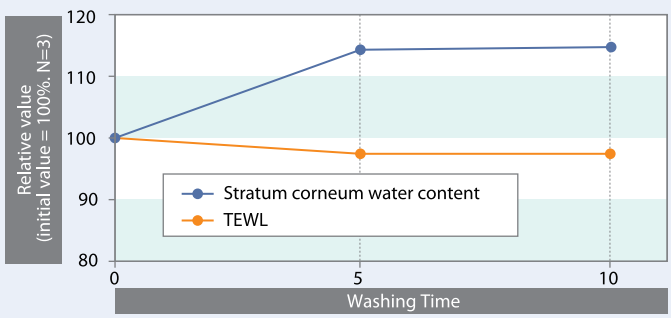
Appearance

■ Pellicer™ D-phase gel is a two-phase, O/W type gel stabilized by finely dispersed oil particles (around 1 µm) in a continuous phase of Pellicer™, water and polyhydric alcohol.

(Contact us for more detailed manufacturing process)

## 【Skin care effect of Pellicer™ oil gel】

***Pellicer™ oil gel has improved stratum corneum water content and TEWL in continuous washing.***




Makeup remover gel (Mineral oil based)

| | Pellicer™ oil gel | |
|---|---|---|
| | Ingredients | wt% |
| Aqueous phase | Pellicer™ L-30 | 1 |
| | Glycerin | 20 |
| | 70% Sorbitol aqueous solution | 5 |
| Oil phase | Mineral Oil (5.8–8.9mm²/s) | 47 |
| | Isononyl Isononanoate | 15 |
| | Dimethicone (6mm²/s) | 5 |
| | Cyclobentasiloxane | 5 |
| | PEG-20 Glyceryl Triisostearate | 2 |

**Test method**

■ Apply the sample (0.2g) on medial part of forearm and rinse with water for 30 seconds. Repeat the procedure for 10 times. Measure before application, at 5th repeat and 10th repeat. CORNEOMETER CM825, TEWAMETER TM300

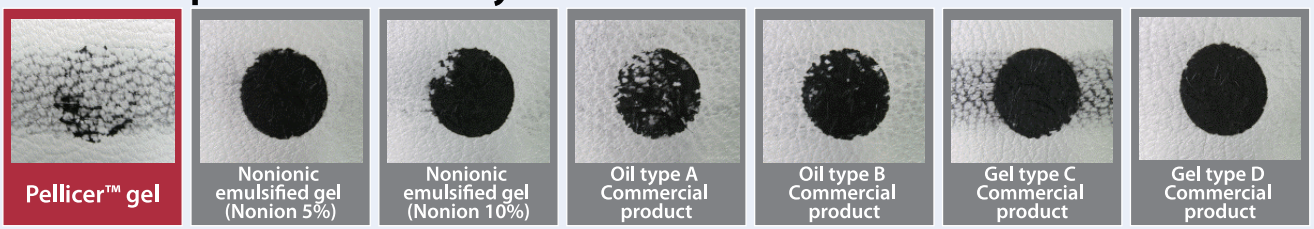
# Makeup removal ability of oil gels

*Pellicer™ oil gel has excellent cleansing effects*

## ■ Makeup removal ability for lipsticks


**For lipstick, Pellicer™ oil gel exhibits removal ability comparable to oil-type removers.**

## ■ Makeup removal ability for mascara



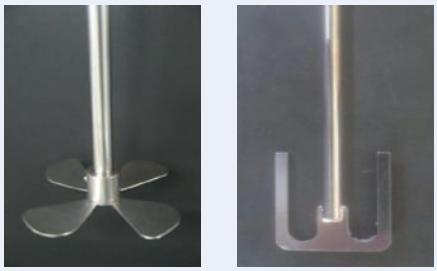

**For waterproof mascara, Pellicer™ oil gel works better than oil-type removers.**

| | |
|---|---|
| Formulation | ■ Pellicer™ oil gel (see the page on the left).<br>■ Nonionic emulsified gel (nonion 5%, 10%): Nonionic surfactant is Polyglyceryl-10 Myristate Substitute the nonionic surfactant for Pellicer™, and adjust the amount of Mineral Oil accordingly.<br>◆ Oil type A Commercial product: Mineral oil base + nonionic surfactant.<br>◆ Oil type B Commercial product: Ester oil base + nonionic surfactant.<br>◆ Gel type C Commercial product: Silicon oil base + water + Polymeric thickener + nonionic surfactant.<br>◆ Gel type D Commercial product: Ester oil base + water + Polymeric thickener + nonionic surfactant. |
| Test method | ■ Visual evaluation after rinsing.<br>■ Equipment: Mini-Martindale tester manufactured by James H. Heal & Co.Ltd. |

## 【Notes for production】

■ For 100g scale prototyping, use the agitator blades below.

Recommended agitator blades



Agitator blades not recommended

■ For 1.5kg scale prototyping, use the vacuum mixer homogenizer.

**Points and procedure (100 g scale)**

1. Add 2 - 3% water to the aqueous phase before adding the oil phase.
2. Use trivalent or higher alcohols (Glycerin or Sorbitol) for polyhydric alcohols. Gels are not formed with Diol, such as Butylene Glycol.
3. Mix Pellicer™, Glycelin and water evenly.
4. When adding the oil phase, drop it slowly at 5-10%/ min.
5. Perform post-stirring at 500 rpm for 10 min.
6. Gel is unstable because if post-stirring is insufficient, emulsion particles will not be fine enough.

Pellicer™

## Precautions on the handling and use of Pellicer™

- We have made a separate Safety Data Sheet (SDS) available. Please refer to it before handling the product.
- Seal the product and store it in a cool, dark place.
- No preservatives are used, so use immediately after opening.
- Please investigate the safety and conformity of your product to the relevant laws and regulations, as well as any infringement of intellectual property rights held by third parties.

All data, values, and information given in this document represent typical results based on the indicated standards and test methods, but do not represent any specification or any warranty or guarantee of any nature relating to performance or utilization, and are subject to change without notice.

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