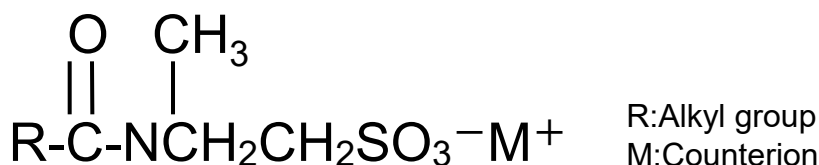


## 1 Feature

“DIAPON<sup>®</sup> series” are amino acid-based surfactants consisted of sodium acyl methyl taurate. They provide a moisturizing feeling and an excellent foaming property in wide pH range. DIAPON<sup>®</sup> series are the mild washing surfactants that show low irritation for skin and hair.



| DIAPON <sup>®</sup> series |         |                                                                    | INCI Name                           |
|----------------------------|---------|--------------------------------------------------------------------|-------------------------------------|
| Product name               | R-(C=O) | M                                                                  |                                     |
| DIAPON <sup>®</sup> K-SF   | Cocoyl  | Na                                                                 | SODIUM METHYL COCOYL TAURATE        |
| DIAPON <sup>®</sup> HF-SF  | Caproyl | Na                                                                 | SODIUM METHYL CAPROYL TAURATE       |
| DIAPON <sup>®</sup> K-SG   | Cocoyl  | H <sub>3</sub> N(CH <sub>2</sub> ) <sub>2</sub> SO <sub>3</sub> Na | SODIUM TAURINE COCOYL METHYLTAURATE |

### Plant-derived surfactants having similar chemical structure to biological materials.

They are amino acid based surfactants similar to biological material, therefore they have natural image.

### Excellent foam ability in wide pH range

DIAPON<sup>®</sup> series show high foam ability and foam stability, and make rich foam in wide pH range.

### Sebum-selective cleansing ability

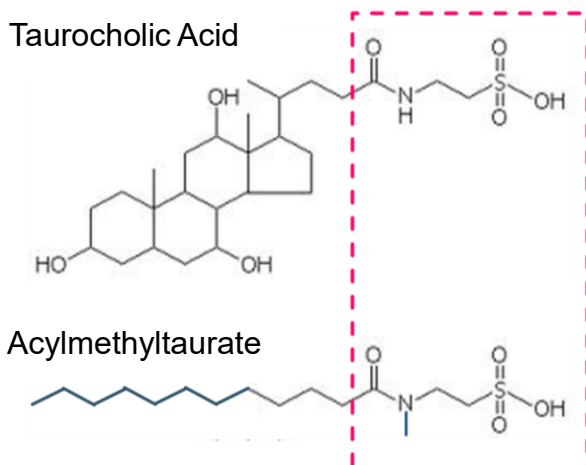
DIAPON<sup>®</sup> series can wash out stain on skin, but don't wash out necessary biological lipid for us.

### Low irritation

DIAPON<sup>®</sup> series are the mild surfactants that show low remaining property on skin and low irritation for eyes. Especially, DIAPON<sup>®</sup> HF-SF remarkably show low irritation for eyes.

## 2 Functionality

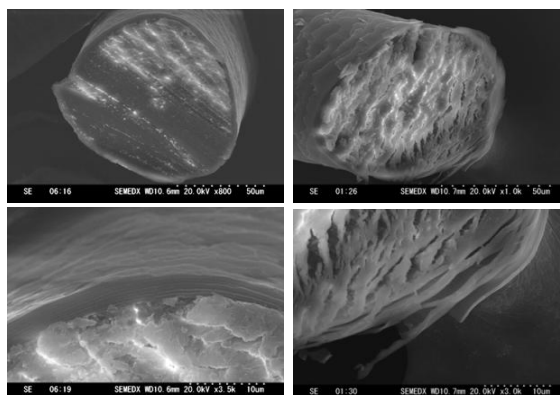
### Similar structure to biological material



### Influence of surfactants on hair

#### DIAPON<sup>®</sup> K-SF

#### Sodium Laureth Sulfate



Concentration of surfactants solution : 100mM  
Processing condition by ultrasonic wave  
: 25~35°C, 3h, 47kHz 150W

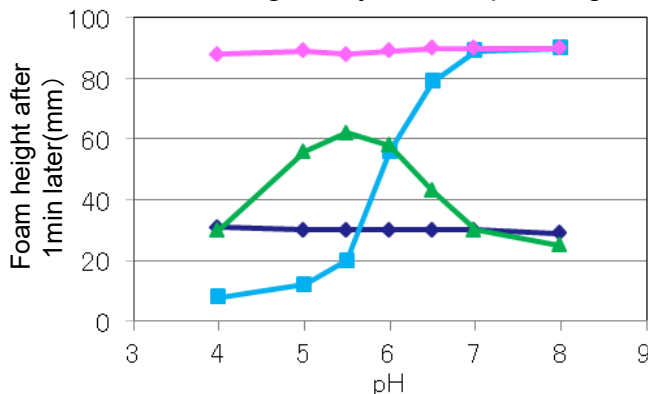
DIAPON<sup>®</sup> has natural image because of similarity to biological material (taurocholic acid).

The surface of hair treated with DIAPON<sup>®</sup> K-SF shows resistance to damages.

## 2 Functionality

### Foaming ability

#### Excellent foaming ability in wide pH range



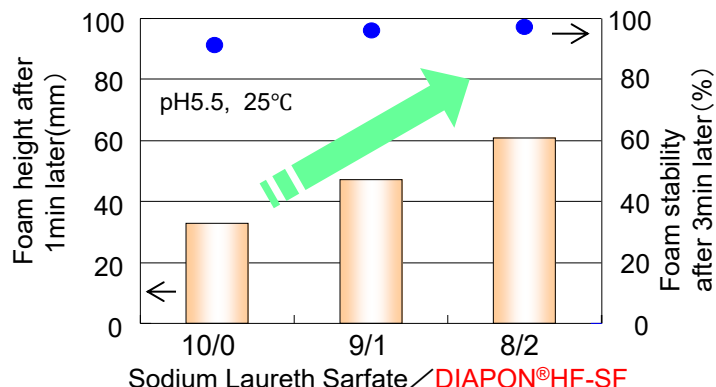
- ◆ DIAPON® K-SF
- ▲ Sodium Cocoyl Glutamic Acid
- Sodium Lauroyl Methyl Taurate
- Sodium Laureth Sulfate

Measurement condition

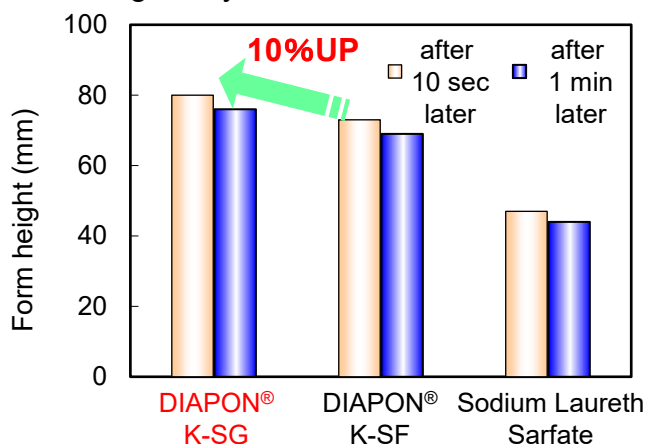
Method: ① 1wt% surfactant water solution was stirred 5 seconds by mill mixer.

② After later after stirring, foam height was measured.

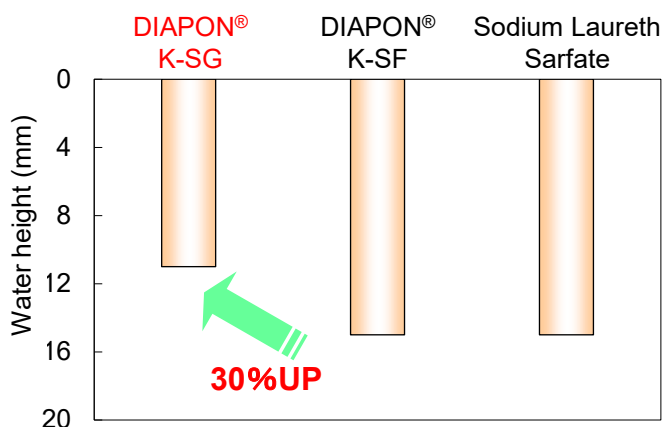
#### Foam increasing effect of DIAPON® HF-SF



#### Foaming ability of DIAPON® K-SG

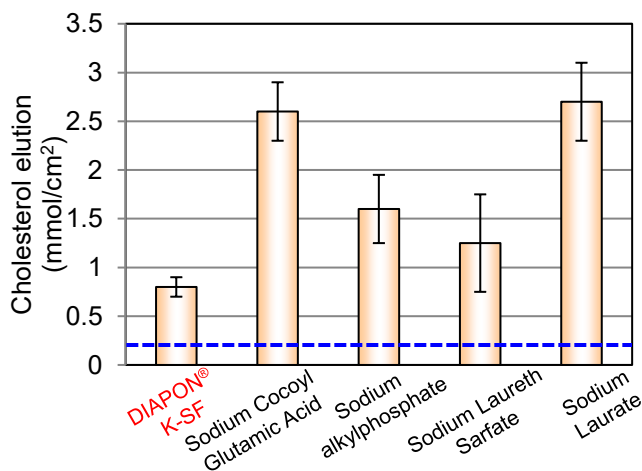


#### Foam stability of DIAPON® K-SG



### Selective washability

#### Elution test of cholesterol

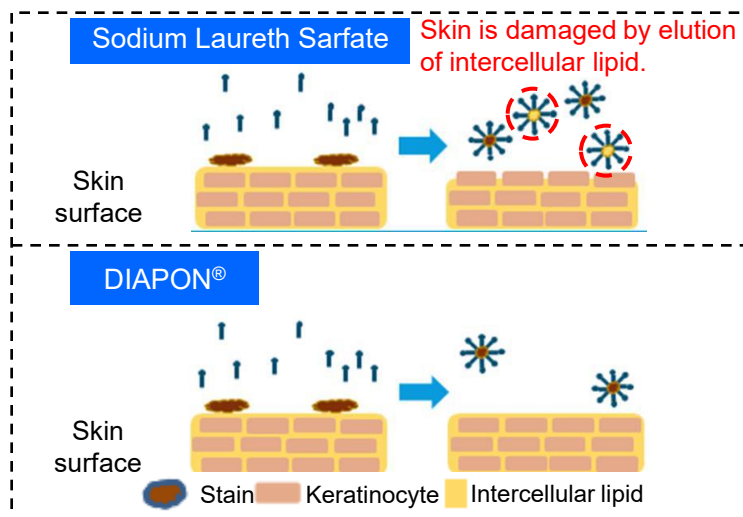


Measurement condition

Sample: Skin of human breast Condition: 25mM surfactants, 10min

Method: After tape stripping, measuring cholesterol with HPLC.

※ Broken line shows the sample treated with water only.



Moisture-retaining effect of taurine provide moisture feeling to hair.

## 2 Functionality

### Moisture-retaining property

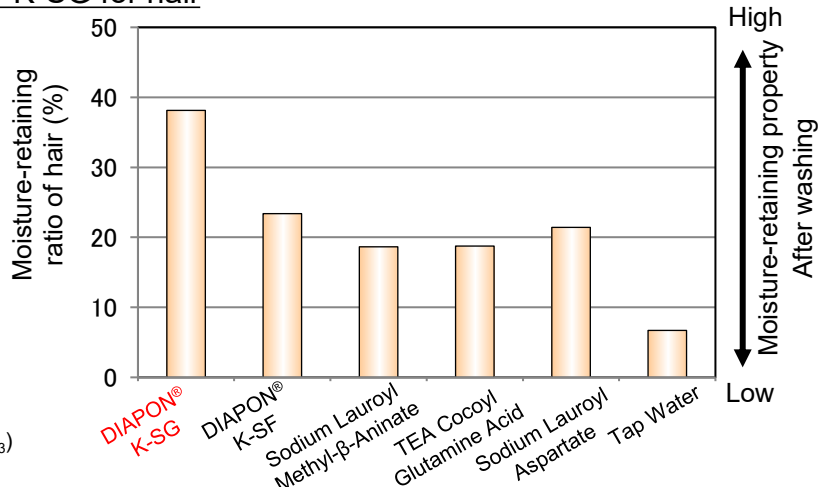
#### Moisture-retaining property of DIAPON®K-SG for hair



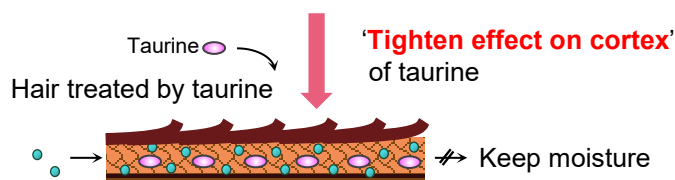
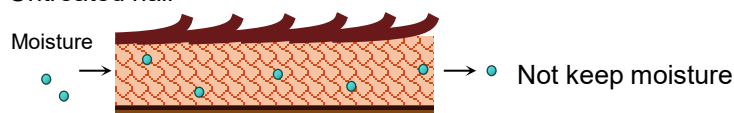
Halogen moisture meter (Mettler-Toledo)

##### Measurement condition

- Method : ① Wash damaged hair by 1wt active% surfactant solution in artificial hard water(100 ppm of CaCO<sub>3</sub>) for 15 minutes at 25°C.  
 ② Rinse off hair sample by enough amount of water.  
 ③ Dry the hair sample at the constant temperature and humidity room.  
 ④ Measure at 60°C, 105°C with moisture analyzer.



##### Untreated hair



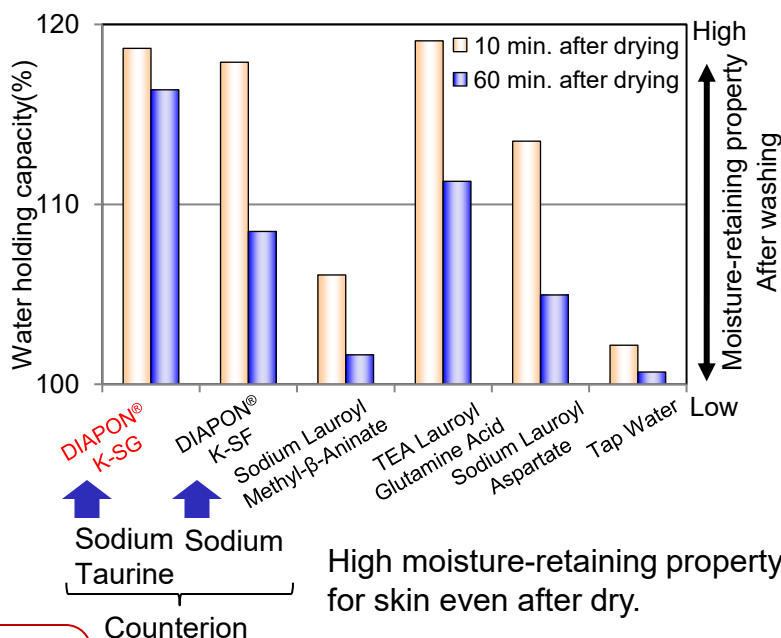
Moisture-retaining ratio of hair(%)

$$= \frac{\text{Remaining amount of water content in blowing hair (Remaining amount of water evaporation at 60°C)}}{\text{Total water content in hair (Amount of water evaporation at 105°C)}} \times 100$$

#### Moisture-retaining property of DIAPON®K-SG for skin



<Skicon 200EX>



Counterion  
 Sodium Taurine    Sodium

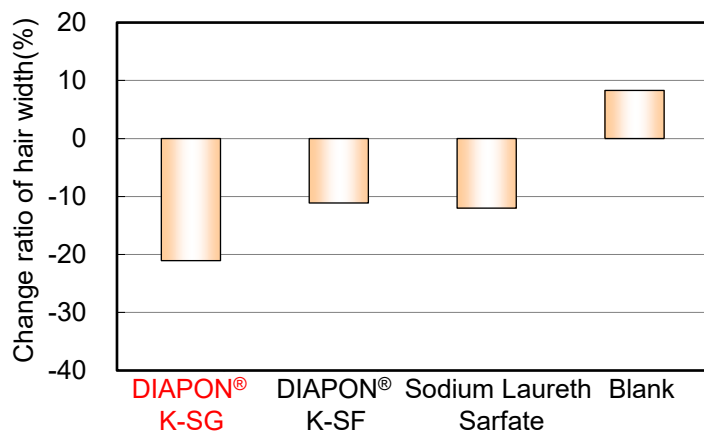
High moisture-retaining property for skin even after dry.

$$\text{Water holding capacity(\%)} = \frac{\text{Electrical conductivity after treating by surfactant}}{\text{Electrical conductivity before treating by surfactant}} \times 100$$

DIAPON® K-SG is suitable for Scalp-care concept.

## 2 Functionality

### Suppression effect of hair fly



#### Measurement condition

- Method: ① Wash damaged hair by 1wt active% surfactant solution in artificial hard water (100 ppm of  $\text{CaCO}_3$ ) for 15 minutes at 5°C (Blank means treatment with water).  
 ② Rinse off hair sample by enough amount of water.  
 ③ Dry the hair sample at the constant temperature and humidity room.  
 ④ Comb hair at 5 times.  
 ⑤ Measure the hair width on the 5cm from bottom of the hair.

DIAPON® K-SG suppresses a dry feeling and a starchy feeling and gives cohesiveness to the hair.

### Low-temperature stability

| Ingredients                         | Active component (wt%) |
|-------------------------------------|------------------------|
| Sodium Taurine Cocoyl Methyltaurate | 9.0                    |
| Cocamidopropyl Betaine              | 6.0                    |
| Lauramide DEA                       | 2.0                    |
| Cationized polymer                  | 0.5                    |
| Citric Acid                         | Moderate amount        |
| Water                               | Balance                |
| pH (neat liquid) 5.8                |                        |



#### Appearance of shampoo

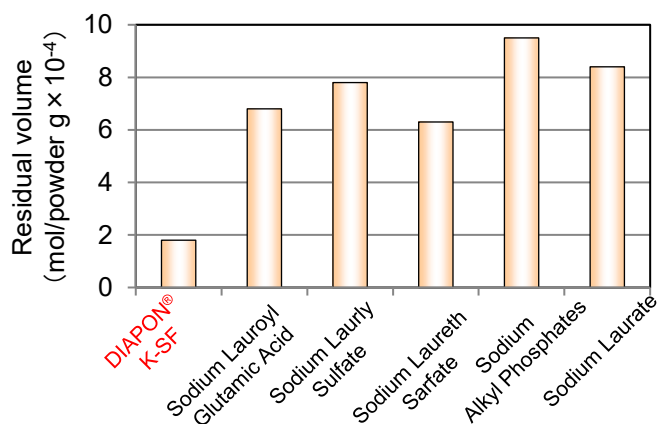
Highly blending DIAPON® K-SG  
 Using PQ-10  
 At -5°C after 1 week

| Cationized polymer | DIAPON® K-SG |
|--------------------|--------------|
| PQ-10              | Clear        |
| PQ-22              | Clear        |
| PQ-7               | Clear        |
| PQ-39              | Clear        |
| PQ-47              | Clear        |

Clear shampoo is obtained by highly blending DIAPON® K-SG and various cationized polymer as content of sodium chloride decrease.

## 3 Safety

### Residual test using similar material to skin

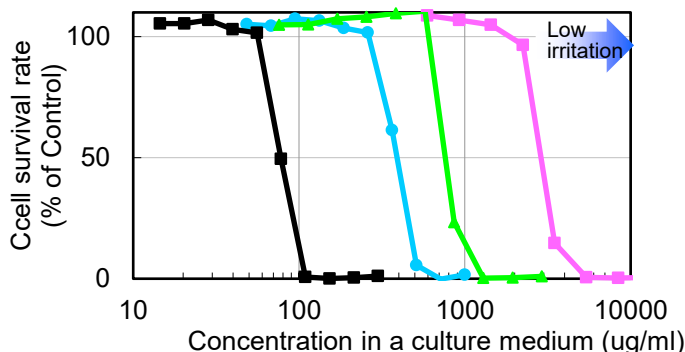


#### Measurement condition

- Sample: Hide powder (skin analogue material)  
 Method: ① Processing: 50mM surfactant, 40°C, Incubate 5 hours.  
 ② After tape stripping, measuring with HPLC.

Reference: Japan Oil Chemists Society. 38(4), 297-305, 1989 "Anionic Surfactants as Detergents for Scalp and Hair"

### Eye irritation test (NR Bio Assay)



- TEA Cocoyl Glutamate  
 DIAPON® K-SF  
 DIAPON® HF-SF  
 Sodium Laureth Sulfate

#### Measurement condition

- Method: ① Adding surfactant aq with various concentration to corneal cell of rabbit.  
 ② NR was extracted 48 hours later, and measured absorbance at 540nm.