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Sanyo Chemical Industries, Ltd.

## **Sanyo Chemical developed an Anti - Dandruff /Itchiness composition for Amino acid-based shampoo**

Reduces adsorption / penetration of surfactants to the scalp and unwashed residue such as sebum

Sanyo Chemical Industries, Ltd. (Headquarters: Higashiyama-ku, Kyoto, President & CEO: Takao Ando) is focusing on the development of cosmetic raw materials by leveraging our expertise in surface control technology to propose attractive solutions in the cosmetic field. We are pleased to announce that we have developed an amphoteric surfactant\*<sup>1</sup> PIUSERIA AMC which is an effective amino-acid based shampoo ingredient. PIUSERIA AMC can reduce dandruff and itchiness by using it with amino-acid based anionic surfactants.

### **【Background of the development】**

Amino acid-based surfactants are plant-derived cleaning ingredients, and are featured by their gentle detergency that gently cleanses while retaining moisture. Taking advantage of this feature, they are mainly used in shampoos, facial cleansers, etc. In recent years, there has been an increasing demand for shampoos that are less irritating to the skin and scalp. In contrast, it has become clear that amino acid shampoos also have some problems related to dandruff and itchiness.

Scalp problems such as dandruff and itchiness have various factors such as dryness, unwashed residue, disturbed turnover due to damage such as stress, and dermatitis. We have developed the effective shampoo ingredient in reducing dandruff and itchiness, by making use of the accumulated knowledge of our surface control technology.

### **【Abstract of the new technology】**

Shampoo uses a surfactant to wash away dirt from the hair and scalp. Amino acid-based anionic surfactants\*<sup>2</sup>, such as disodium cocoyl glutamate are mainly used as cleaning agents for amino acid-based shampoos.

They are known for their extremely mild detergency and little damage to the scalp. Normally, they are rarely used alone, and other surfactants are mixed to demonstrate the best performance as shampoos. In particular, amphoteric surfactants (betaine type and amino acid type) are often used as auxiliary agents because they not only improve detergency and foaming, but also give a moist feeling after washing. Among such amphoteric surfactants, we have developed the one can reduce dandruff and itching.

Causes of dandruff and itchiness include adsorption of surfactants to the scalp and unwashed styling agents and sebum. We have reviewed the optimum structure and ionicity of the surfactant from the viewpoint of the steric hindrance and surface tension.

As a result, it was confirmed that it is possible to formulate shampoos with less adsorption to

the scalp and less unwashed residue by PIUSERIA AMC with the amino acid-based anionic surfactant. PIUSERIA AMC is an amino acid-type amphoteric surfactant, and like other amino acid-based surfactants, it is also less irritating to the skin and hair.



◆ Reduction effect of the dandruff / itchiness by using PIUSERIA AMC in combination with an amino acid-based anionic surfactant

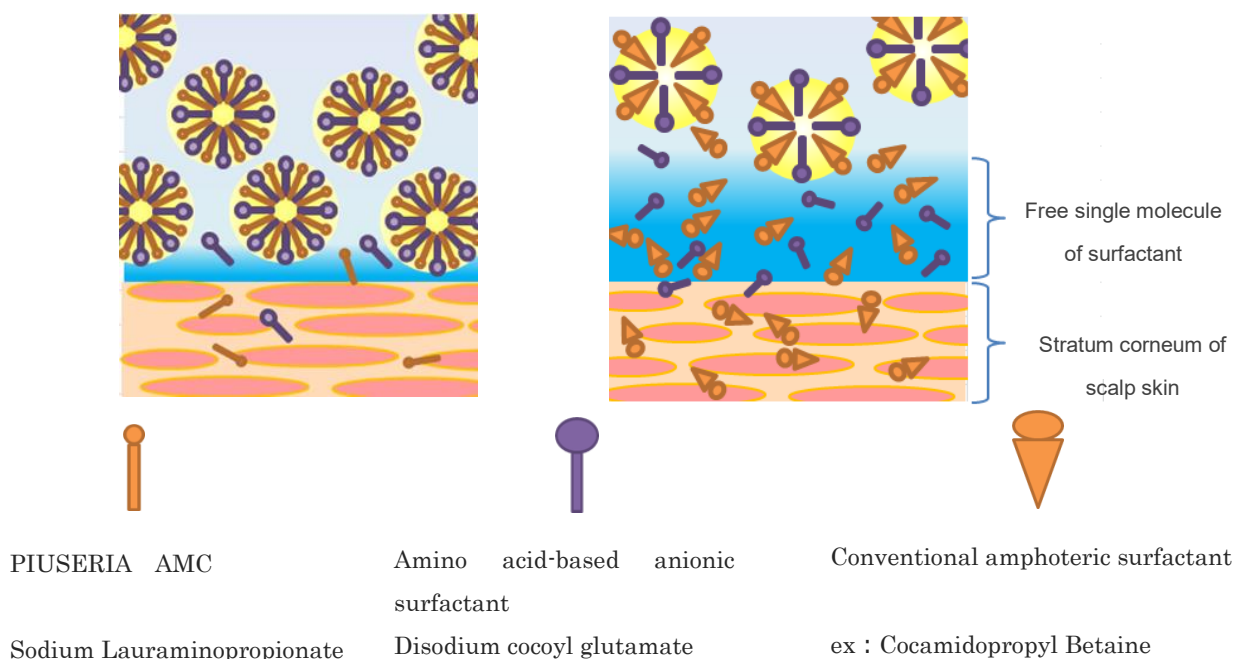
1) Surfactant activity can be maintained even at low concentrations, and unwashed residue can be reduced.

PIUSERIA AMC is characterized by its less steric hindrance structure among amphoteric surfactants. When used with an amino acid-based anionic surfactant, the critical micelle concentration (cmc <sup>\*3</sup>) becomes low, and even when the surfactant concentration in water is low, an associated micelle structure can be formed. This indicates that even if the surfactant concentration is low during rinsing, the surfactant activity such as emulsification and solubility can be maintained, and dirt can be removed to the end to reduce unwashed residue. In addition, since the amount of liberated single-molecule surfactant is small, the residue of the surfactant itself can be reduced.

2) Improves detergency with fine bubbles.

Generally, if the detergency of the surfactant is improved, it will remove too much oil from the hair, and it will also cause irritation, so detergency tends to trade-off with irritation. However, when PIUSERIA AMC is used with an amino acid-based anionic surfactant, it removes the dirt by floating with fine bubbles and improves the efficiency, instead of strengthening its detergency. It is also known that the finer the foam, the less the adsorption of the surfactant on the stratum corneum of scalp skin, and the possibility that the surfactant itself causes skin irritation such as itching can be reduced. In addition, our other surfactants BEAULIGHT SHAA (SODIUM LAURYL GLYCOL CARBOXYLATE), NEWPOL DDE-10 (PEG-1 LAURYL GLYCOL), FROTHMEISTER series (PPG-SORBITOL/PPG-24-GLYCERETH-24, PPG-75-PEG-300 HEXYLENE GLYCOL) can be used in combination to further improve the fineness of the foam.

All of the above features have been confirmed in combination with disodium cocoyl glutamate, which is a typical amino acid-based anionic surfactant.



### <Illustration of surfactants and their formation of micelle>

#### 【Future Plan】

Demand for amino acid shampoos is expected to continue to increase. We will develop applications of PIUSERIA AMC, which reduces dandruff and itchiness, as an effective cleaning agent for high class shampoos used in salon, etc. We will continue to focus on product development in the cosmetics field and propose comprehensive and attractive solutions.

#### <Cosmetic Information>

PIUSERIA AMC

INCI Name :SODIUM LAURAMINOPROPIONATE

#### <Reference>

##### \*1 Amphoteric surfactant

When dissolved in water, amphoteric surfactants have both anions and cations. Since they have both ionic properties, they exhibit the properties of anionic surfactants in the alkaline region and the properties of cationic surfactants in the acidic region. There are carboxylate type, amino acid type, betaine type, etc.

##### \*2 Amino acid-based anionic surfactant

Amino acid-based anionic surfactant is an anionic surfactant having an amino acid structure in the hydrophilic part (Surfactants consist of a hydrophilic part and a hydrophobic part).

##### \*3 cmc

Surfactants form aggregate micelles when the concentration exceeds a certain level in water, and they work efficiently at the oil-water interface. This concentration is called the critical

micelle concentration (cmc), and above cmc, surfactants express their performance in the properties such as emulsification, solubility, and foaming. The cmc value can easily change due to environmental factors such as surfactant structure, salt concentration, temperature, and pH..