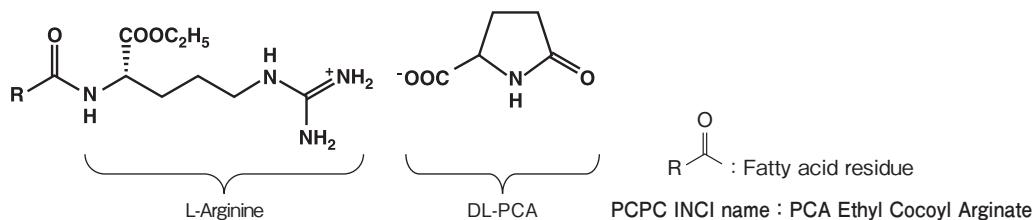


Amino Acid Based Cationic Surfactant

CAE

CAE is an amino acid cationic surfactant derived from L-Arginine, DL-Pyrrolidone Carboxylate, and fatty acid. CAE is a very safe and suitable ingredient for cosmetic products. CAE is adsorbed to the hair and acts as a hair conditioner. CAE is biodegradable despite the fact that it is a cationic surfactant.

Molecular Structure



Major Applications

- Skin Care Products : creams, lotions, tonics, shower gels, etc.
- Hair Care Products : shampoos, conditioners, hair tonics, hair creams, etc.
- Sun Care Products : pre and post sun care creams, lotions, gels, etc.
- Make-Up Products : foundations, lipsticks, etc.

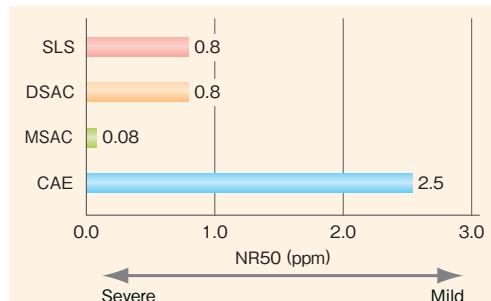
Characteristics

- CAE prevents static electricity and has a conditioning effect on the hair.
- CAE is very safe to the skin and eye mucosa, even in high concentration.
- CAE is highly biodegradable.

Safety

CAE is a very safe cationic surfactant. When CAE was compared with other cationic surfactants for cell toxicity by using the neutral red staining * method, the NR50 of CAE was higher than that of the surfactants, indicating that CAE has less cell toxicity and is thus milder than other cationic surfactants.

Comparison of cell toxicity with that of other quaternary cationic surfactants and SLS.



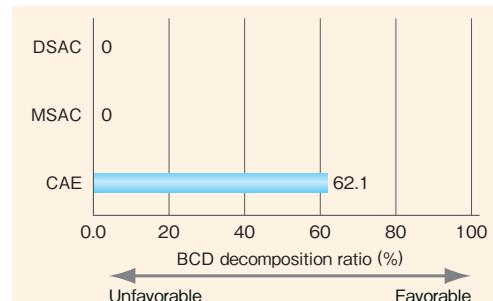
Test method : Toxicity for normal human epidermal keratinocyte was measured by the neutral red staining method. The EpiPack of Kurabo Industries Ltd. was used.

* Neutral red staining (NR50) : NR50 is the concentration at which a test substance inhibits cell growth by 50% and indicates the safety of that substance. A higher concentration means a milder test substance.

Biodegradability

Other ordinary cationic detergents show poor biodegradability, whereas CAE is largely biodegradable.

Comparison with other quaternary cationic surfactants.



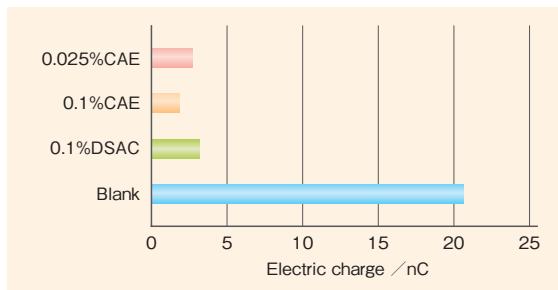
Test method : Biodegradability was evaluated in compliance with Japanese Chemical Substances Control Law. CAE was tested at a concentration of 100 ppm and the extent of decomposition was assayed after 14 days.

SLS : Sodium Lauryl Sulfate, MSAC : Stearyltrimonium Chloride, DSAC : Distearylimonium Chloride, CAE : PCA Ethyl Cocoyl Arginate

Efficacy

● Antistatic property

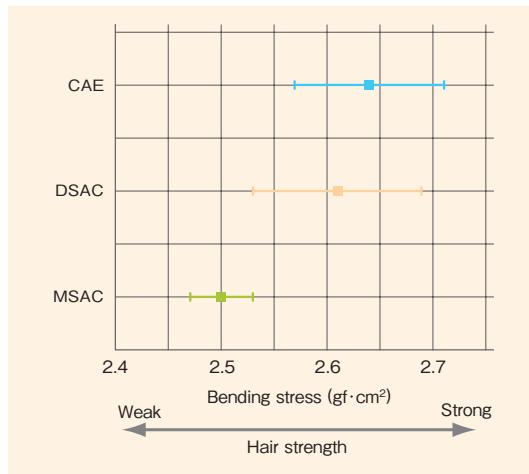
CAE effectively prevents the accumulation of static electricity, so it is a suitable ingredient for hair care products.



Test method : Hairs were washed with LES solution, dried, and their electrical charge was measured. Then the hairs were submerged in the test substance solution, washed in water, and dried, after which the electrical charge was re-measured.

● Hair resilience

By using a hair care product containing CAE, it is possible to improve the resilience of hair. CAE has advantages over other quaternary cationic surfactants with respect to recovery from stress due to bending of hair.



Measurement method : After washing with an LES solution, the hair tresses were treated with 1% aqueous solutions of various cationic surfactants. Then the bending stress of the hairs (recovery from bending) was measured by using a hair resilience test apparatus (Kato Tech).

● Minimum inhibitory concentration (MIC)

Strains	Minimum inhibitory concentration (MIC)
Escherichia coli	250
Pseudomonas aeruginosa	250
Staphylococcus aureus	7.8
Streptococcus mutans	3.9
Propionibacterium acnes	31.3
Candida albicans	250
Aspergillus niger	500
Trichophyton rubrum	62.5

CAE : 1% Solution (μ g/mL)

Material information

Product Name	Product Code	Chemical Name	CAS No.	Physical Form	Packaging	PCPC INCI Name	Composition (%)
CAE	-	DL-Pyrrolidonecarboxylic Acid Salt of L-Cocoyl Arginine Ethyl Ester	95370-65-3	Powder	1kg Carton 5kg Carton	PCA Ethyl Cocoyl Arginate	100.0

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