

Eat Well, Live Well.



March 7, 2019

# Alternatives for microplastics in personal care ingredients

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AJINOMOTO CO., INC.**



# Why personal care ingredients produced by Ajinomoto?

# Amino acid-based surfactants derived from natural origins

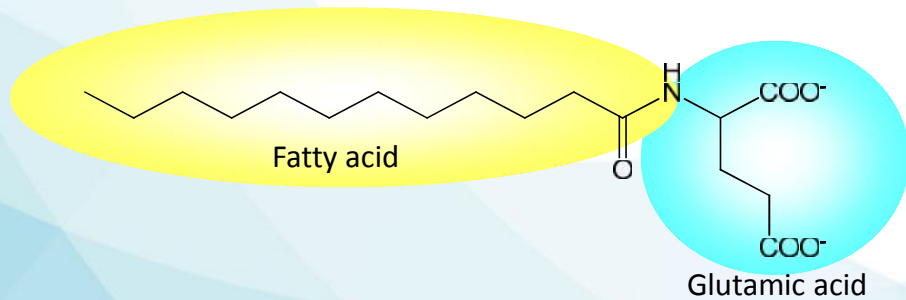
We developed and launched the world's first mild amino acid based surfactant – AMISOFT® – in 1972. Its weakly acidic human-friendly features with highly biodegradable environmental-friendly.



Plant-origin fatty acid



Glutamic acid



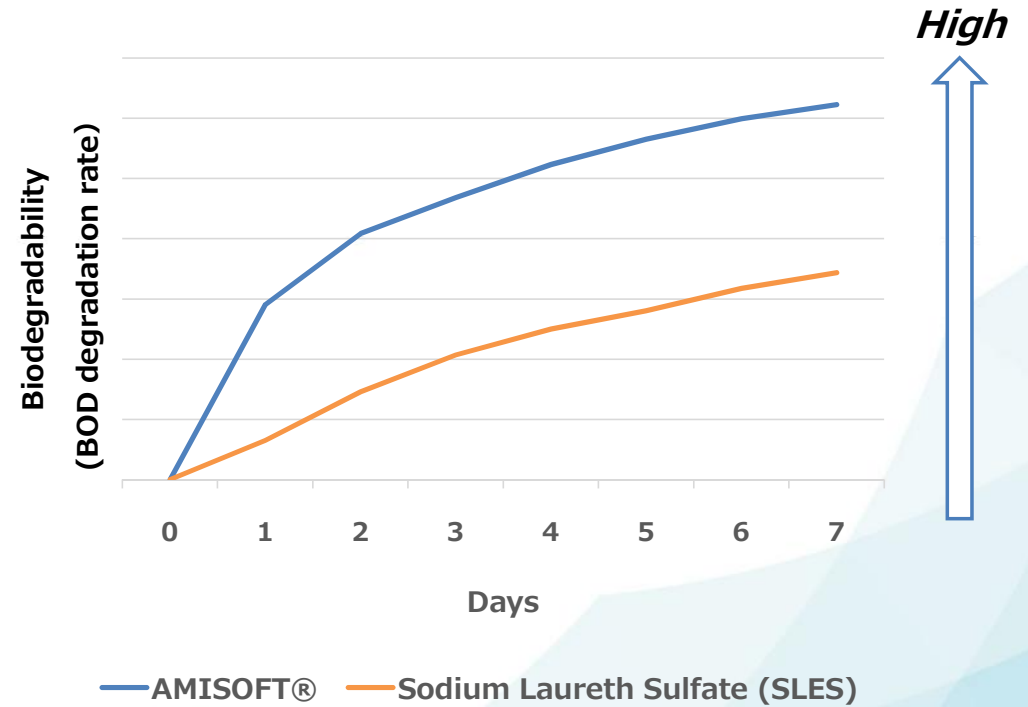
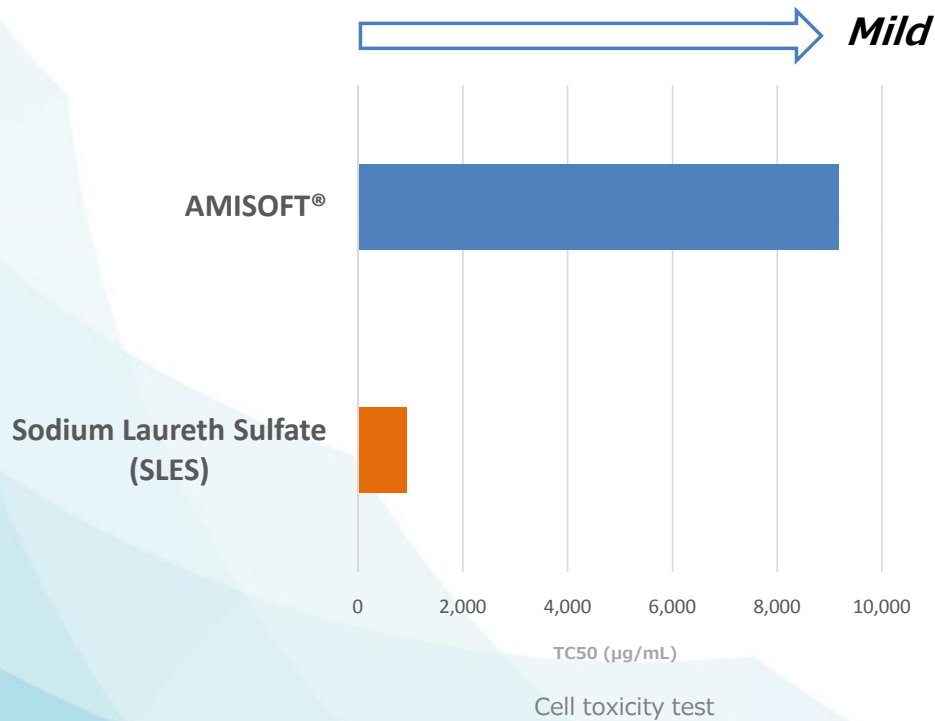
Derived from nature

Highly biodegradable

Mild

# Amino acid-based surfactants derived from natural origins

Mildness and biodegradability of AMISOFT® are better than that of other surfactants.



# Amino acid-based surfactants derived from natural origins

## A cream-type natural foaming facial wash formulation.

|   | (wt%)                |         |                      |
|---|----------------------|---------|----------------------|
| A | <b>AMISOFT</b> (25%) | 20.0    | Cleansing surfactant |
|   | COCO-GLUCOSIDE (52%) | 15.4    | Cleansing surfactant |
|   | GLYCERIN             | 9.0     | Moisturizer          |
|   | ALCOHOL              | 7.0     |                      |
|   | WATER                | Balance | Thickening polymer   |
| B | CARRAGEENAN          | 1.2     | Thickening polymer   |
|   | XANTHANGUM           | 0.4     | Thickening polymer   |
| C | SWEET ALMOND OIL     | 10.0    | Emollient            |
| D | LACTIC ACID (20%aq.) | 0.6     | pH adjuster          |
|   |                      | 100.0   |                      |



Facial Wash Cream WEL-137

# Personal care ingredients derived from amino acids



## SURFACTANTS

- Anionic

AMISOFT®

AMILITE®

AMINOSOAP

- Cationic

CAE

- Amphoteric

AMISAFE®

## AMINO ACIDS

Acidic

Aspartic Acid

Glutamic Acid

Neutral

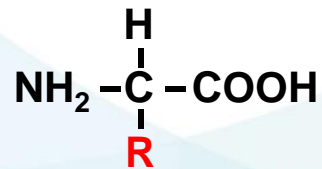
Glycine

Alanine

Basic

Arginine

Lysine



## Other Derivatives

### HUMECTANTS

AQUADEW®

AJIDEW®

PRODEW®

### EMOLLIENT

ELDEW®

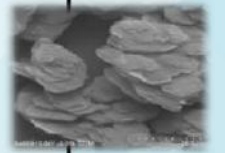
### GELATINIZATION AGENTS

GP-1

EB-21

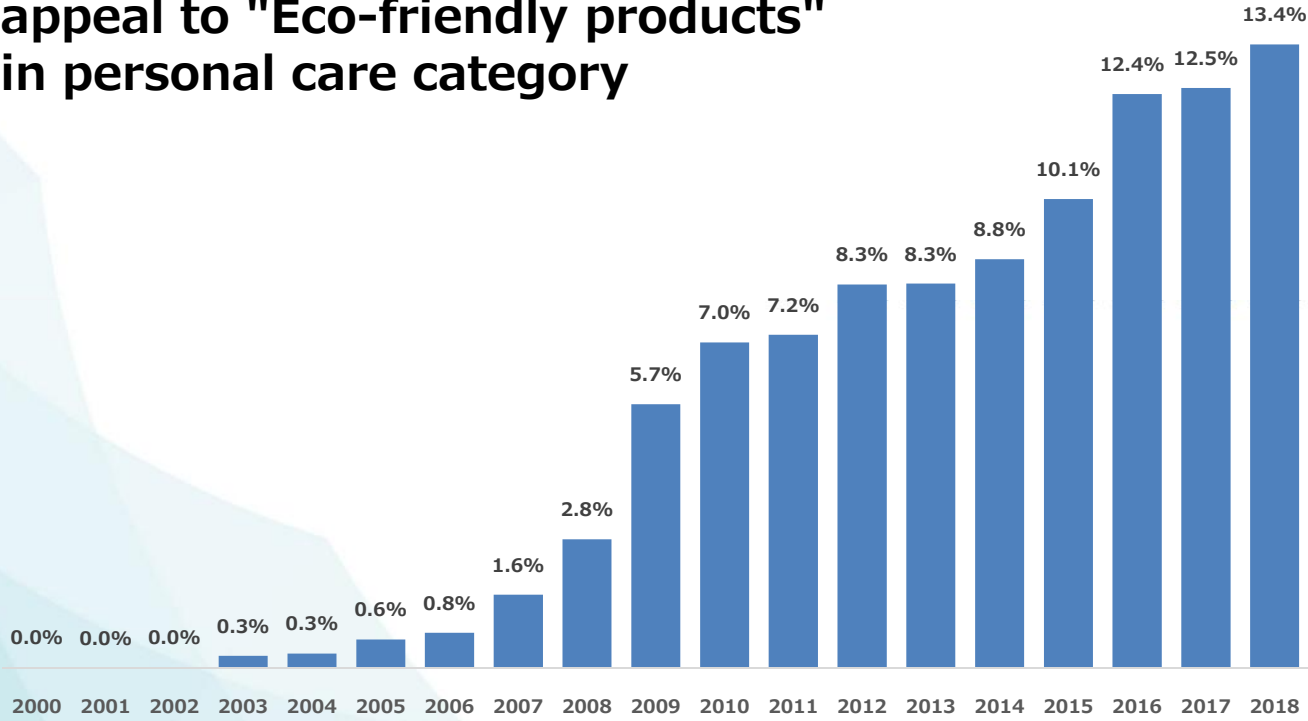
### FUNCTIONAL POWDER

AMIHOPE®



# Expanding of Eco-friendly products

The proportion of products that appeal to "Eco-friendly products" in personal care category



Petroleum-based products



Slash and burn agriculture



# One of the biggest environmental threats of microplastics

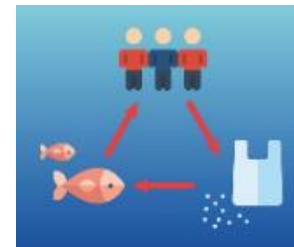
## ✓ Primary microplastics

include industrial 'scrubbers' used to blast clean surfaces, plastic powders used in moulding, **micro-beads in cosmetic formulation**, and plastic nanoparticles, typically < 5 mm in diameter.



## Secondary microplastics

result from the fragmentation and weathering of larger plastic items. This can happen during the use phase of products such as textiles, paint and tyres, or once the items have been released into the environment.



GESAMP  
Joint Group of Experts on the  
Scientific Aspects of Marine  
Environmental Protection



UN Environment launched Clean Seas (#CleanSeas on social media) in February 2017, with the aim of engaging governments, the general public and the private sector in the fight against marine plastic pollution.  
<https://www.cleans seas.org/>



# Microplastics consumption in personal care category

- ✓ Polyethylene beads consumption for Cleansing as scrub is decreasing because of environmental regulation in each country.
- ✓ Polyamide beads consumption for Make-up is still increasing.

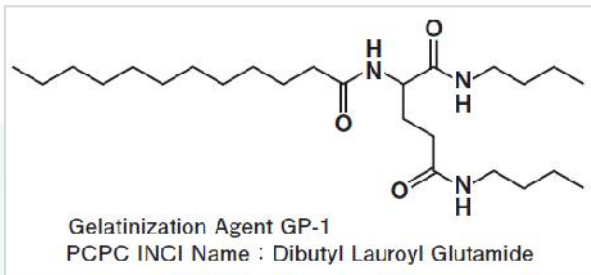
Consumption in Japanese market (ton)

| Microplastics                 | Main application | 2014       |   | 2017       |
|-------------------------------|------------------|------------|---|------------|
| Acrylate beads (PMMA)         | Make-up          | 350        | → | 350        |
| Polyamide beads (Nylon, PA12) | Make-up          | 140        | → | 150        |
| Polyurethane(PU) beads        |                  | 50         |   | 50         |
| Polyethylene(PE) beads        | Cleansing        | 30         | ↔ | 5          |
| Other plastic beads           |                  | 100        |   | 100        |
| <b>Total (ton)</b>            |                  | <b>670</b> |   | <b>655</b> |



# Ideal solution to waterfowl habitat (Just an idea)

Clean up method of microplastics in oily surface seashores with our oil Gelatinization agent, GP-1.



### Test method in laboratory

- 1) Put microplastics, mineral oil type car engine oil and water into beaker
- 2) While 1) is stirred, GP-1 is added.
- 3) Stop stirring, when the oil is gelatinized.

1)



2)



3)



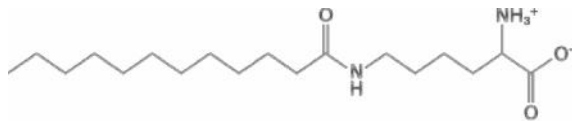
After Gelatinized



Microplastics with oil

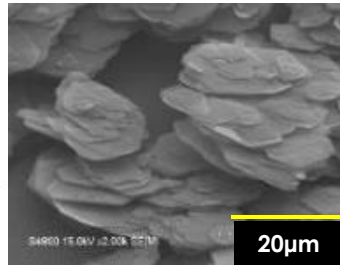
# AMIHOPE<sup>®</sup> as microplastics alternative

We developed amino acid-based organic powder as non plastic powder for mainly Make-up application and started supply from 1985.



PCPC INCI name : Lauroyl Lysine

Flat hexagonal crystal



- ✓ Natural origins
- ✓ RSPO certified
- ✓ Highly biodegradable

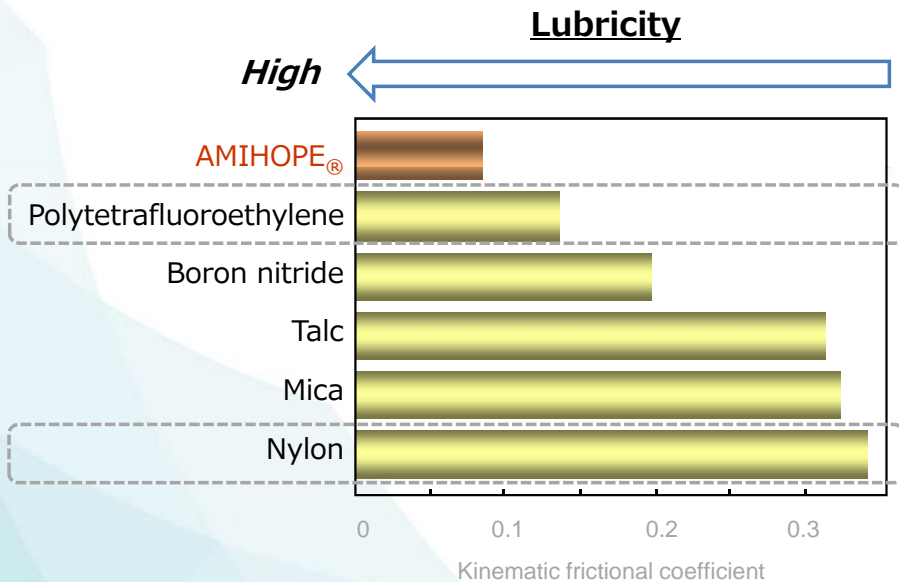


More than 90% degraded (BOD) 12.5-day biodegradation study



# AMIHOPE<sup>®</sup> as microplastics alternative

AMIHOPE<sup>®</sup> imparts smooth and even spreadability compared with major powders for Make-up application.



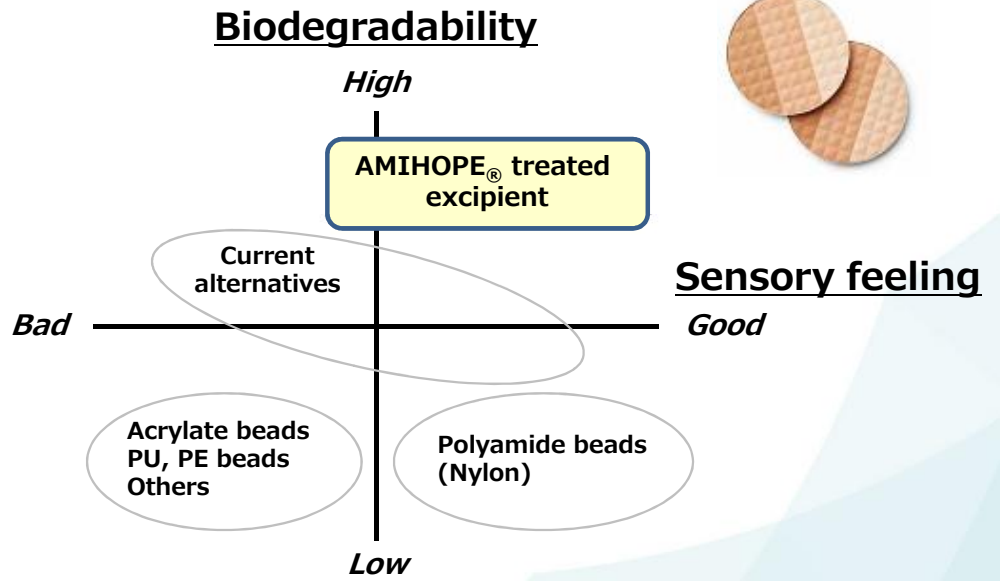
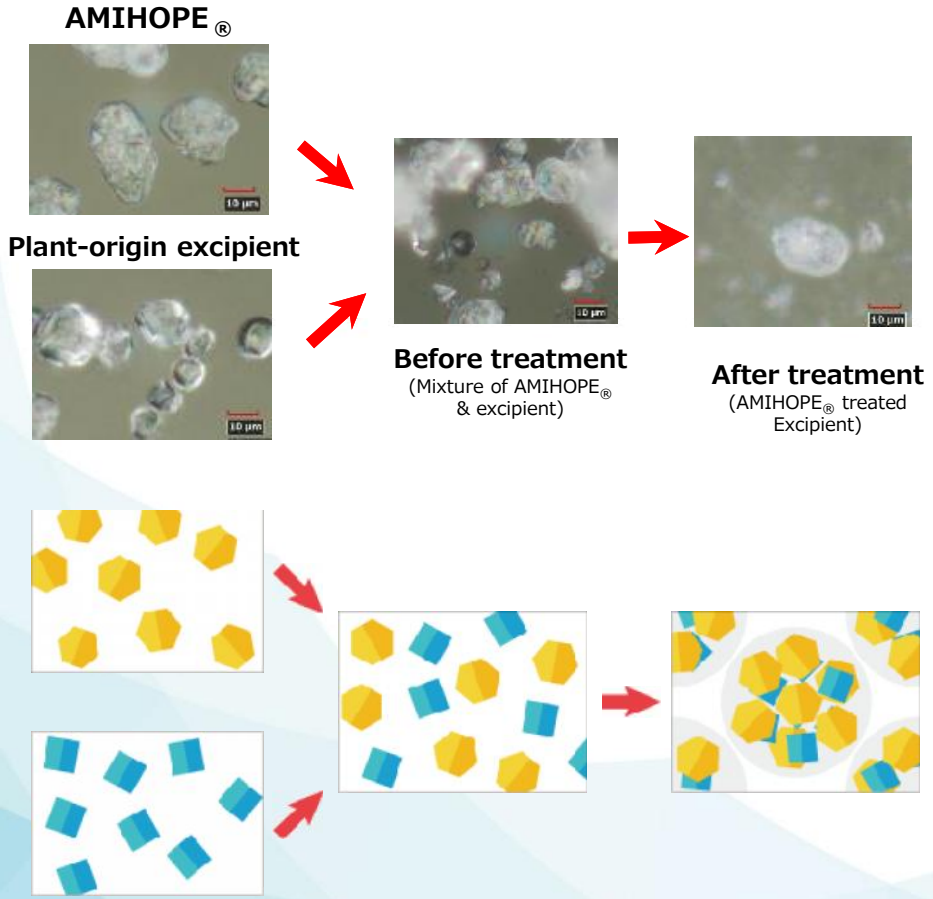
## Formulation of loose powder foundation without microplastics

|   |   |       | wt %        |
|---|---|-------|-------------|
| A | <b>AMIHOPE<sup>®</sup></b>              | 10.00 | Texturizer  |
|   | Bismuth Oxychloride                     | 1.00  | Colorant    |
|   | Zinc Oxide                              | 1.00  | UV filter   |
|   | Titanium Dioxide and Aluminum Strearate | 7.00  | UV filter   |
|   | Titanium Dioxide                        | 2.00  | Pigment     |
|   | Mica                                    | 74.75 | Extender    |
|   | Iron Oxide and Dimethicone              | 2.54  | Colorant    |
| B | Squalane                                | 1.00  | Emollient   |
|   | <b>ELDEW<sup>®</sup></b>                | 0.50  | Emollient   |
|   | Tocopherol                              | 0.01  | Antioxidant |
|   | Preservative                            |       |             |
|   |   | 100.0 | PALK-017    |



# AMIHOPE<sup>®</sup> as microplastics alternative

Our powder processing technology for microplastics alternative (Patent applied for)



# AMIHOPE<sup>®</sup> by more natural and eco-friendly production

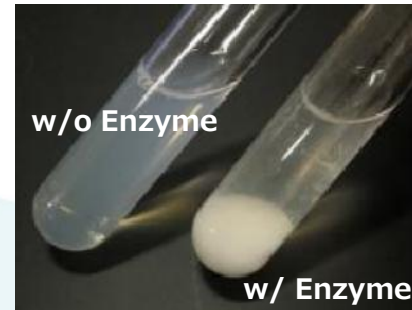
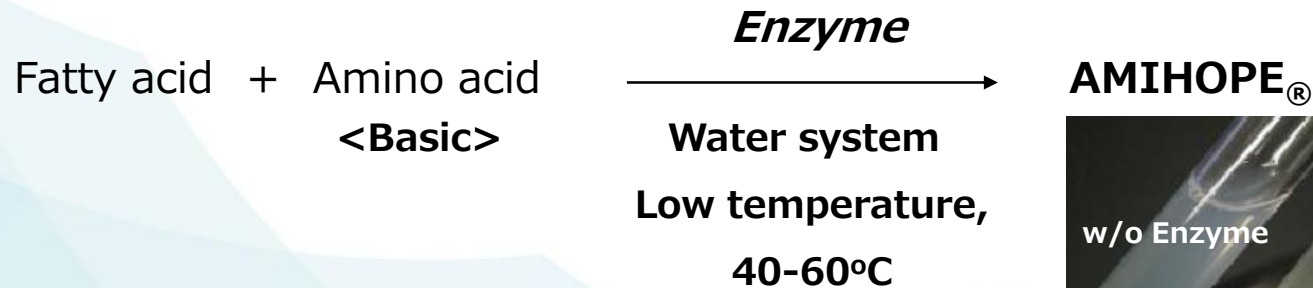
## Outline of our technologies for enzymatic production

- Patent publication, WO2017/082374

### Conventional production by chemical synthesis



### Enzymatic production



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**Contribution to save the earth with Ajinomoto's environmentally friendly amino acids-based personal care ingredients.**