



Vegetamide 18MEA-R

Cetearamidoethyl Diethonium Hydrolyzed Rice Protein

Vegetamide 18MEA-NJ

Vegetamide 18MEA-NJS

Cetearamidoethyldiethonium Succinoyl Hydrolyzed Pea Protein

*Plant-derived hair conditioning ingredients
developed with focusing on hair surface structure*

7th edition: December 18, 2015



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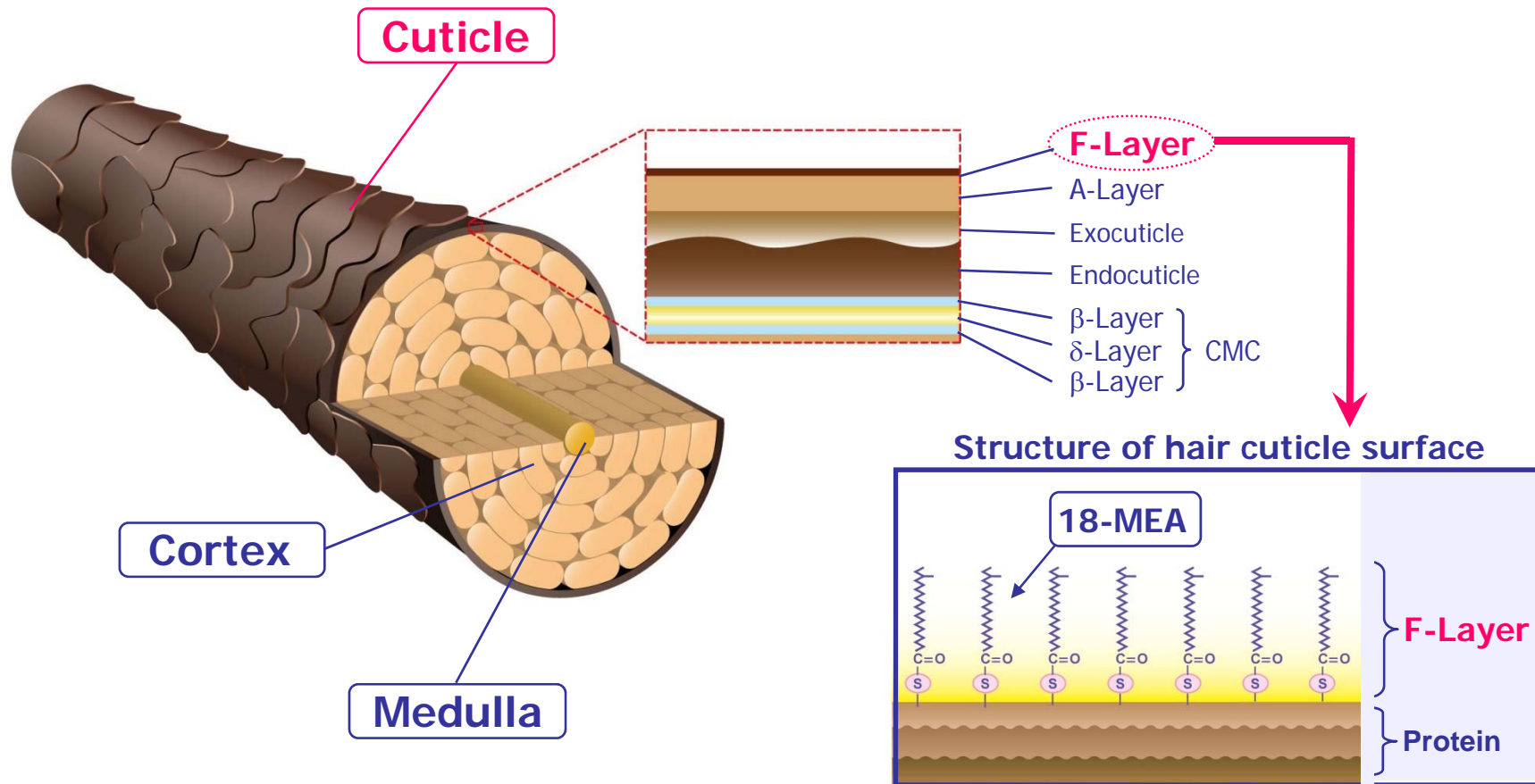
Product information Page. 41

*With experimental data obtained in instrumental evaluation or sensory evaluation by panels.



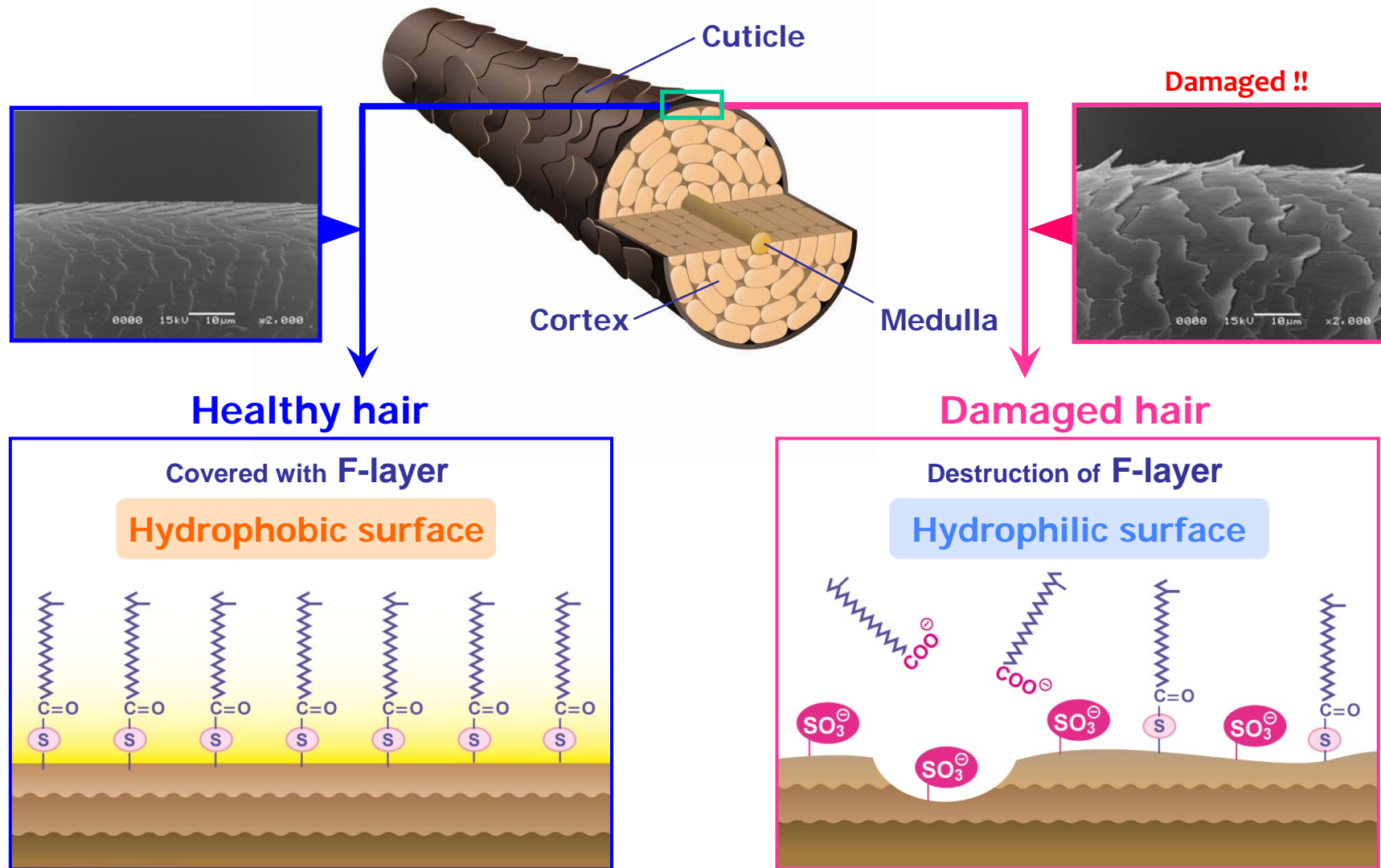
1 Hair surface damage

Hair structure



1 Hair surface damage

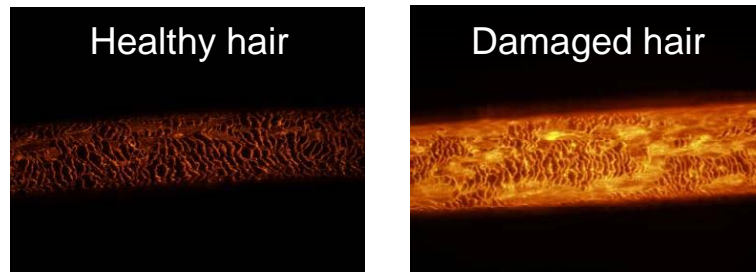
Change in the hair surface by damaging



1 Hair surface damage

Change in the surface polarity of hair with damage

Evaluation with cationic fluorescence dye

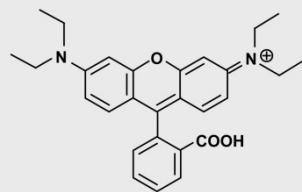


Hydrophobic surface



Hydrophilic surface

Damaged !!

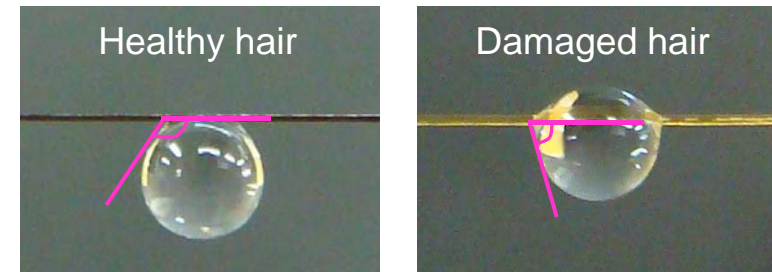


Rhodamine B (RhoB)

Evaluation method

After being stained with Rhodamine B adsorbing the high-polar (anionic) area of hair, the surface of hair was observed.

Evaluation by measuring the contact angle



Hydrophobic surface



Hydrophilic surface

Damaged !!



Contact angle

Evaluation method

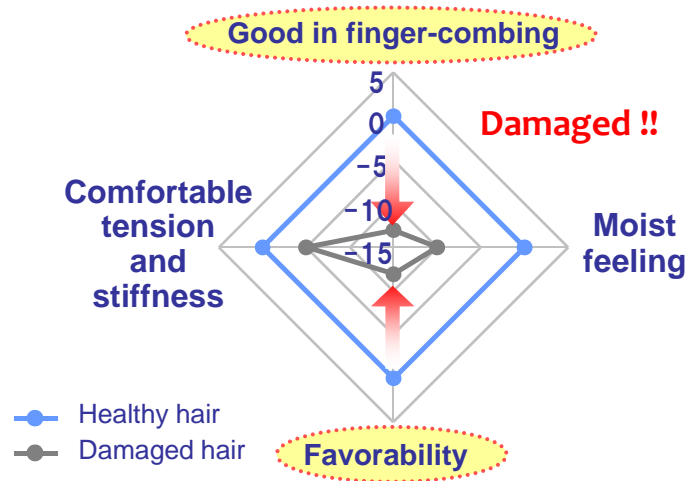
Ionic-exchanged water (approximately 1 μ L) was placed on hair surface, and the contact angle between water droplet and hair surface was measured.

The polarity of hair surface increases by damage and the hair surface becomes hydrophilic.

1 Hair surface damage

Consumers' distress by damage

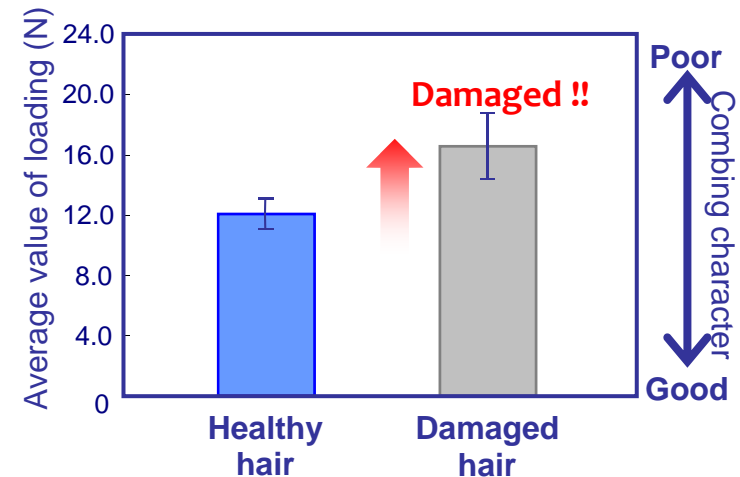
Changes in the sensory texture



Evaluation method

Healthy hair was given 0 point as the base point for each evaluation item, and 10 experienced panels graded the four evaluating items of hair and gave from -2 to +2 points to the items. The total points of each item were summed.

Change in the combing character of hair



Measurement condition

Instrument: Combing tester
(Techno Hashimoto, Japan)
Measurement temperature and humidity:
23 deg C and 52%

Damaged hair is not good at finger-combing and regular combing character, and allow consumers to feel that their hair is in unacceptable condition.

1 Hair surface damage

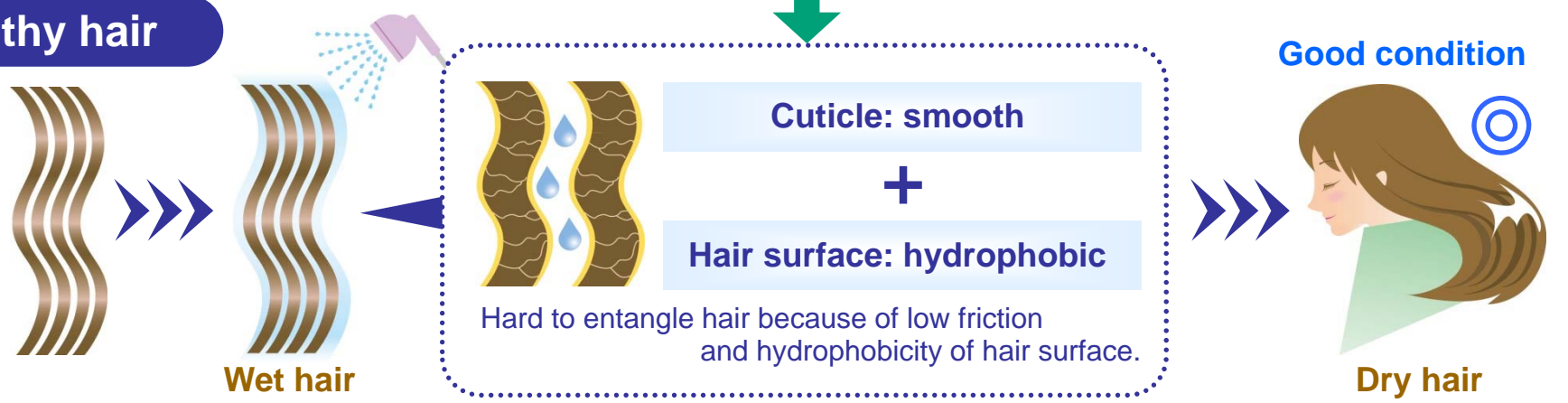
Consumers' distress by damage

Damaged hair



Vegetamide

Healthy hair



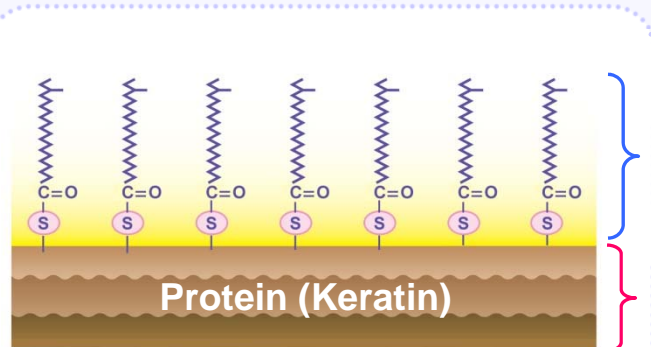
Reference: Hiroto Tanamachi *et al.*, *J.Cosmet. Sci.*, 61, 147-160(2010)

2 What is Vegetamide?

Design of new ingredients repairing damaged hair

Molecular design with focusing on the structure of healthy hair surface

Structure of healthy hair surface



18-MEA connect to hair surface protein

18-MEA

Protein

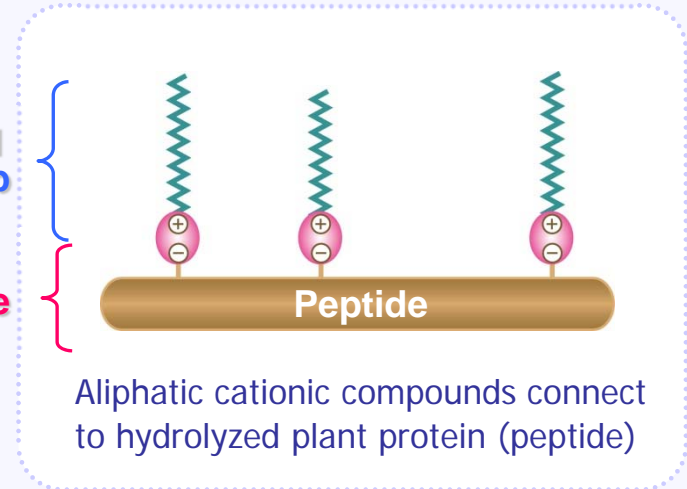
Similar

Alkyl group

Peptide

Similar

Structure of Vegetamide



Aliphatic cationic compounds connect to hydrolyzed plant protein (peptide)

Development of Pseudo-cuticle F-Layer

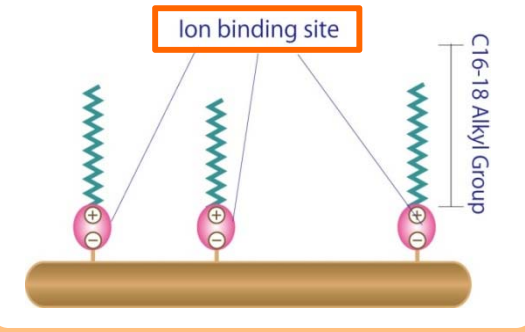
2 What is Vegetamide?

Vegetamide 18MEA-R

INCI Name: Cetearamidoethyl Diethonium Hydrolyzed Rice Protein, Glycerin, Water



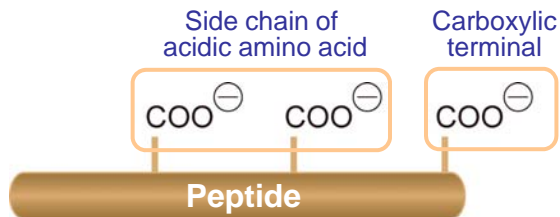
Structure of Vegetamide



Ion binding site

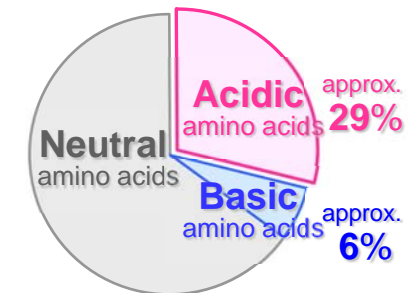
Carboxylic groups of . . .

+ Carboxylic terminal



Vegetamide is an ionic complex material where the carboxylic groups of peptide are connected with aliphatic cationic compounds having C16~18 alkyl moieties through ionic bonds.

+ Side chain of acidic amino acid

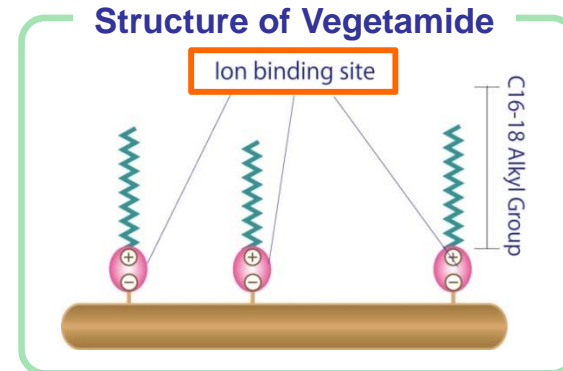
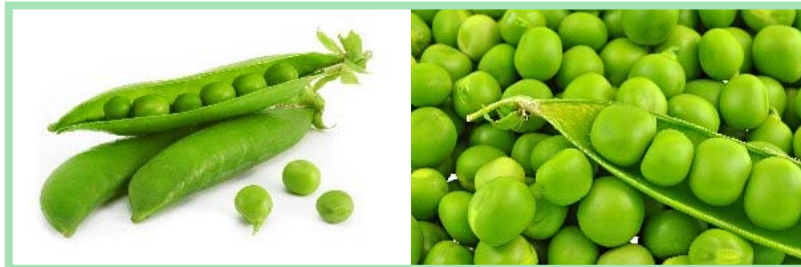


Amino acid composition of hydrolyzed rice protein

2 What is Vegetamide?

Vegetamide 18MEA-NJ and Vegetamide 18MEA-NJS*

INCI Name: Cetearamidoethyldiethonium Succinoyl Hydrolyzed Pea Protein, Glycerin, Water



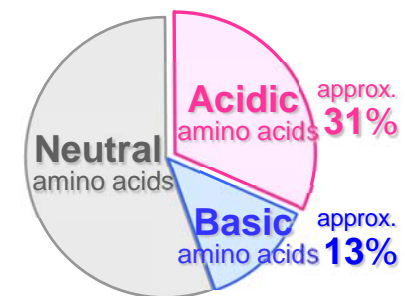
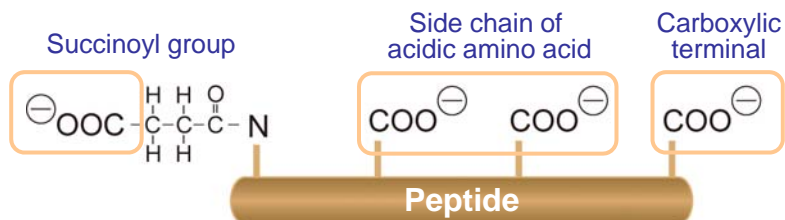
Ion binding site

Carboxylic groups of . . .

+ **Carboxylic terminal**

+ **Succinoyl group**

+ **Side chain of acidic amino acid**



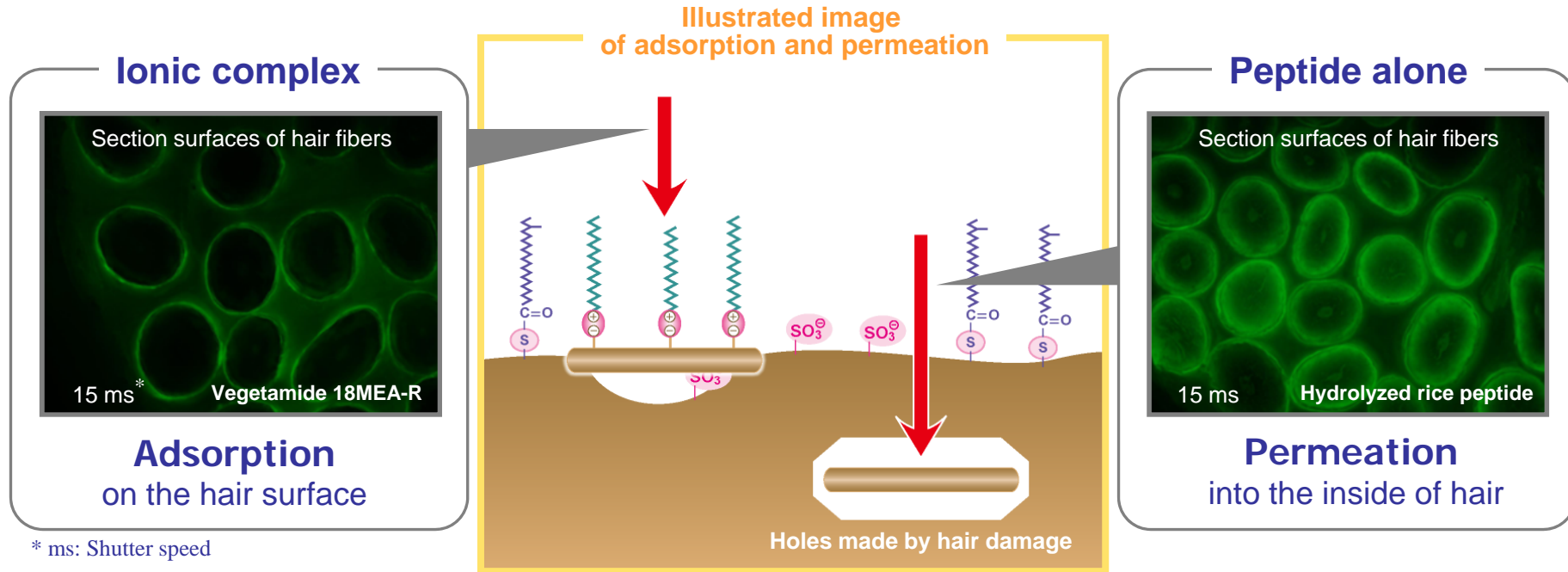
Amino acid composition of hydrolyzed pea protein

* Vegetamide 18MEA-NJS differs in density of active component from Vegetamide 18 MEA-NJ. Vegetamide 18MEA-NJ contains 45% of active component, and Vegetamide 18MEA-NJS contains 7% of active component.

2 What is Vegetamide?

Enhancing the adsorption of peptide on hair surface

Comparison of functional mechanism of ionic complex (Vegetamide) and peptide to the damaged hair.



Evaluation method

The part of peptide was labeled fluorescently with FL, and the adsorption and permeation of the peptide were observed by a fluorescence microscope. Treatment condition: damaged hair (3 times permanent and hair-bleaching treatments) was treated with each sample at 40 degrees C for 10 min.

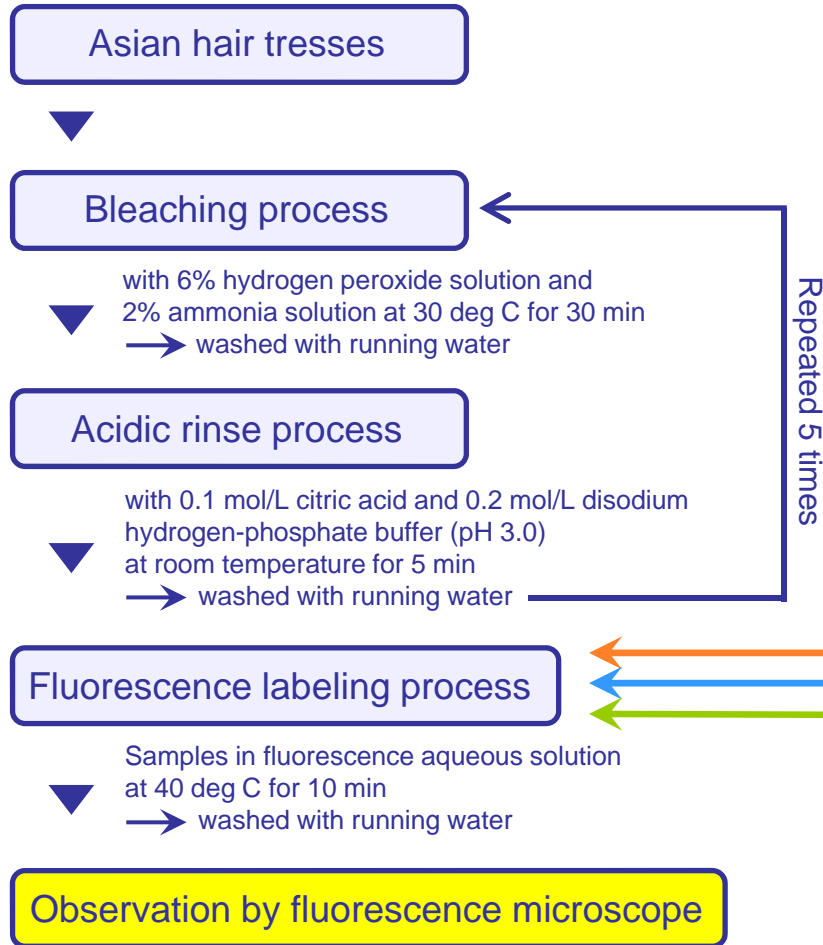
The peptide permeates into the inside of hair.

The peptide also adsorbs on the surface of hair by forming an ionic-complex.

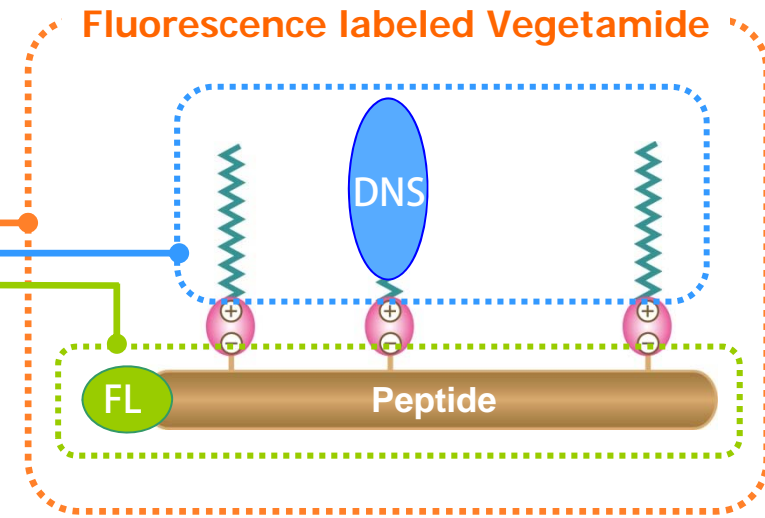
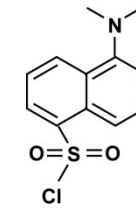
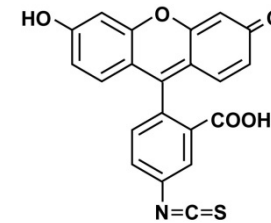
2 What is Vegetamide?

Advantage of forming ionic complex

Method

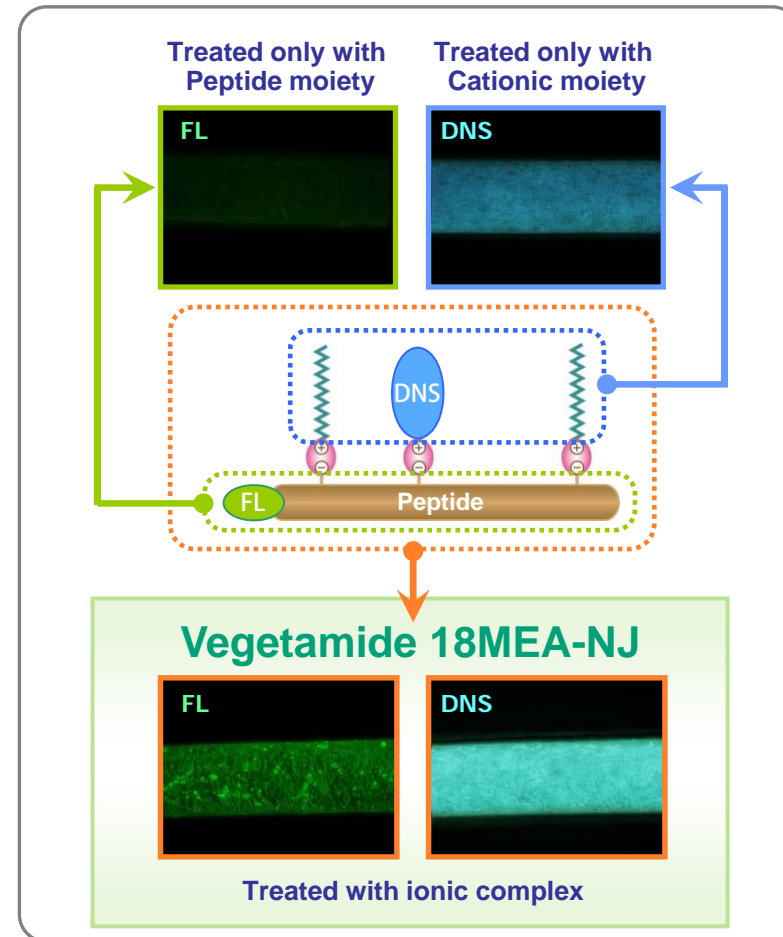
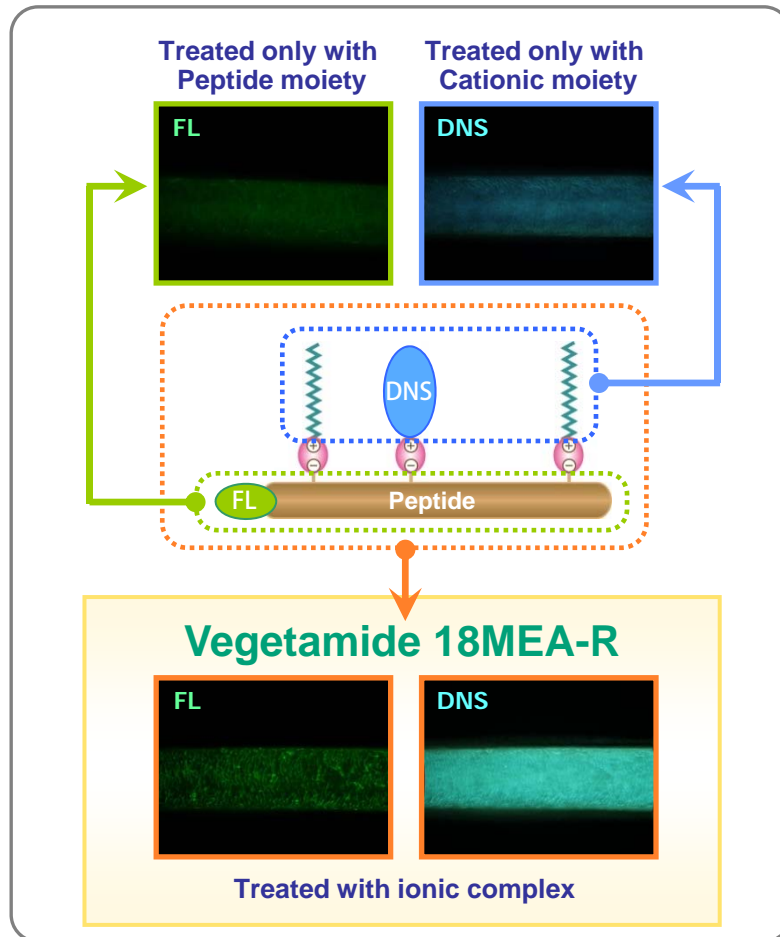


Fluorescence-labeled Vegetamide



2 What is Vegetamide?

Advantage of forming ionic complex

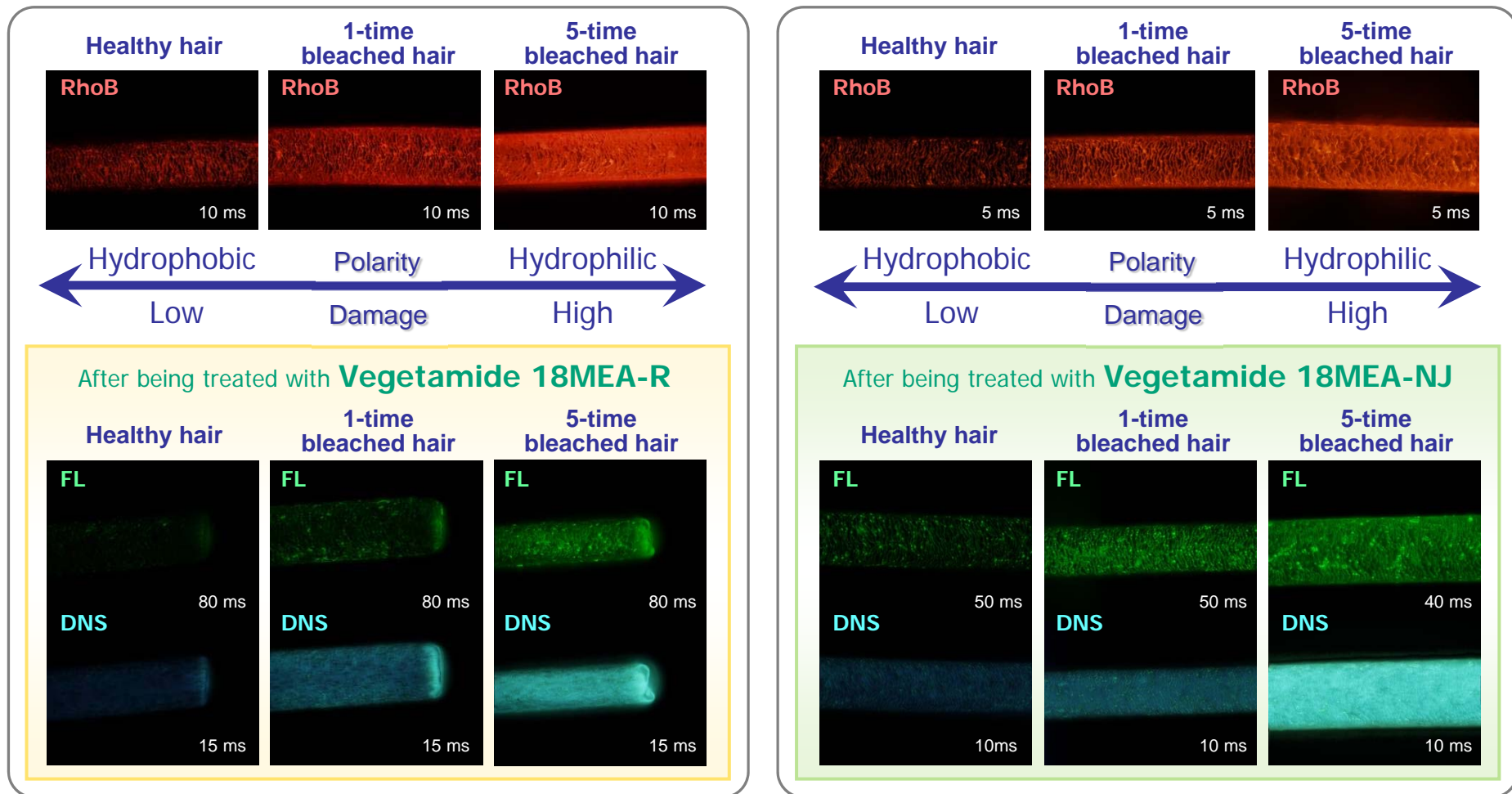


Peptide enhances its adsorption ability to hair surface by forming ionic complex.

2

What is Vegetamide?

Adsorption of Vegetamide depending on degree of hair surface damage

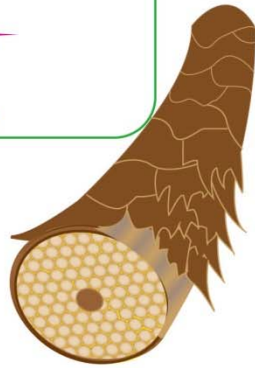
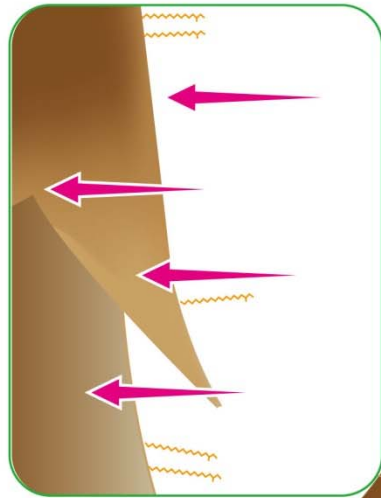


Vegetamide selectively adsorbs on the damaged part of hair surface.

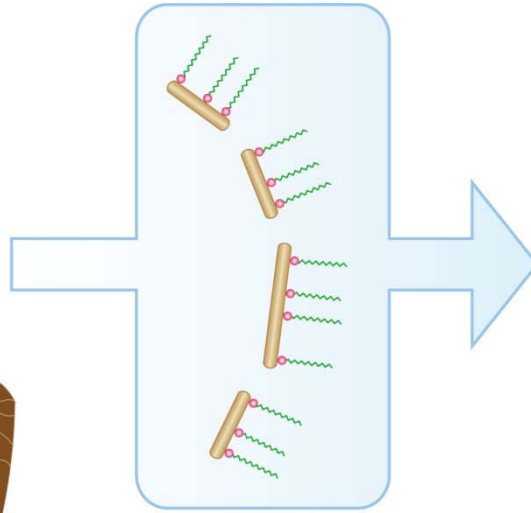
2 What is Vegetamide?

Illustrated image of adsorption of Vegetamide to hair surface

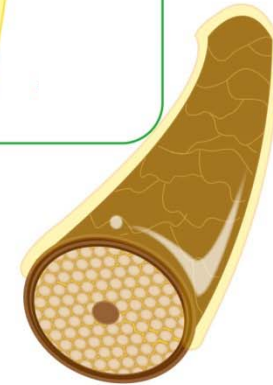
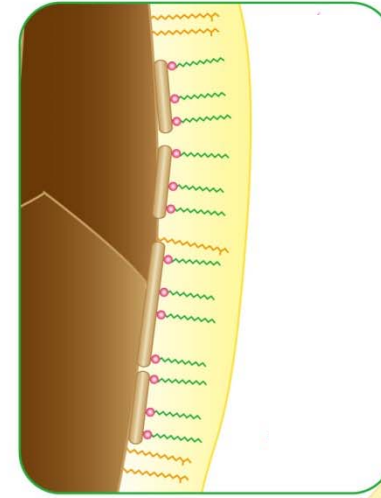
Damaged hair surface



Vegetamide



Adsorption of Vegetamide



Destruction of barrier structure of hair surface (F-Layer) accelerates more and more damages caused by several outside stresses.

Adsorption of Vegetamide to the damaged hair surface restructures barrier structure (pseudo cuticle F-Layer) and normalizes the hair surface character.

3 Repairing effects

Preparation

Evaluation

1. Appearance of cuticle

SEM observation

2. Friction of hair surface

Measurement of
the average friction coefficient

3. Polarity of hair surface

Measurement of the contact angle

4. Hair combing and static character

Measurement of
the combing load
and static electricity

5. Sensory profile

Sensory evaluation

Method

Asian hair tresses

Bleaching process

Repeated 5 times

with 6% hydrogen peroxide solution and
2% ammonia solution at 30 deg C for 30 min
→ washed with running water

Acidic rinse process

with 0.1 mol/L citric acid and 0.2 mol/L
disodium hydrogen-phosphate buffer (pH 3.0)
at room temperature for 5 min
→ washed with running water → dried

Vegetamide treatment

washed with 1.0% SLES* soln. at 40 deg C for 10 min
→ its active component (0.3%) soln.
at 40 deg C for 10 min
→ washed with running water → dried

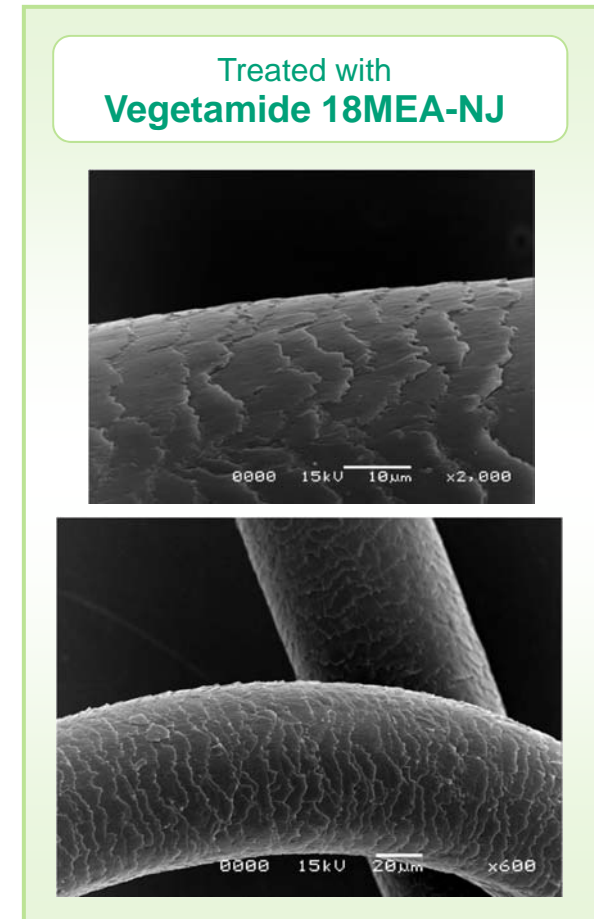
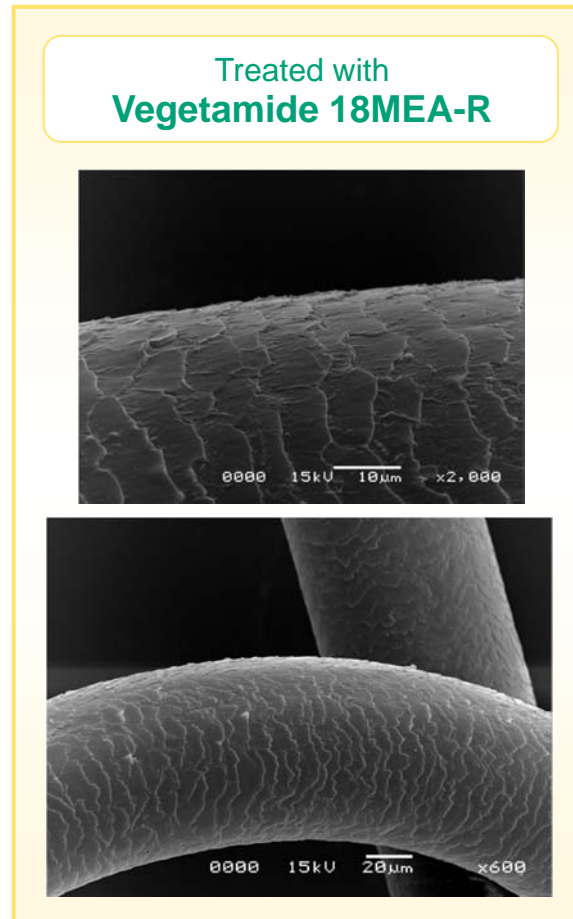
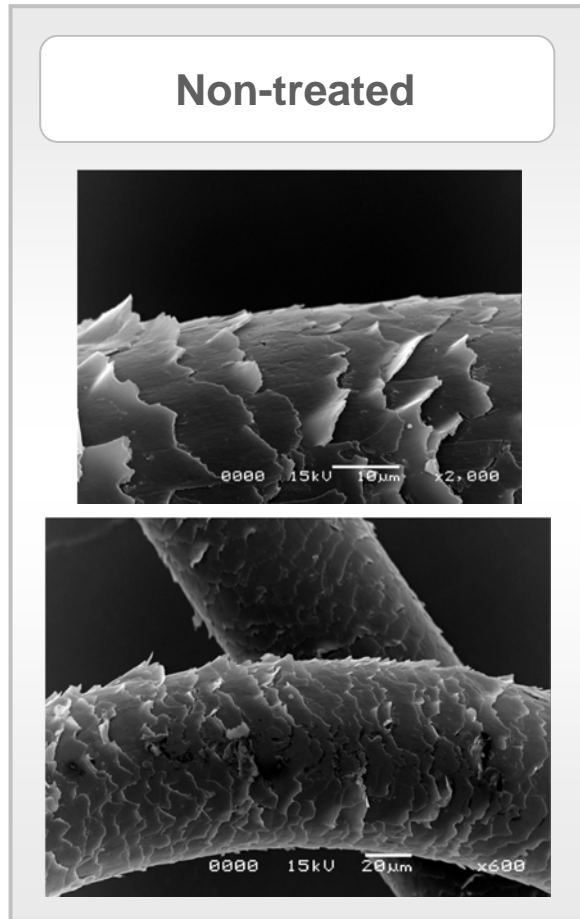
Efficacy evaluation

*Sodium laureth sulfate

3

Repairing effects

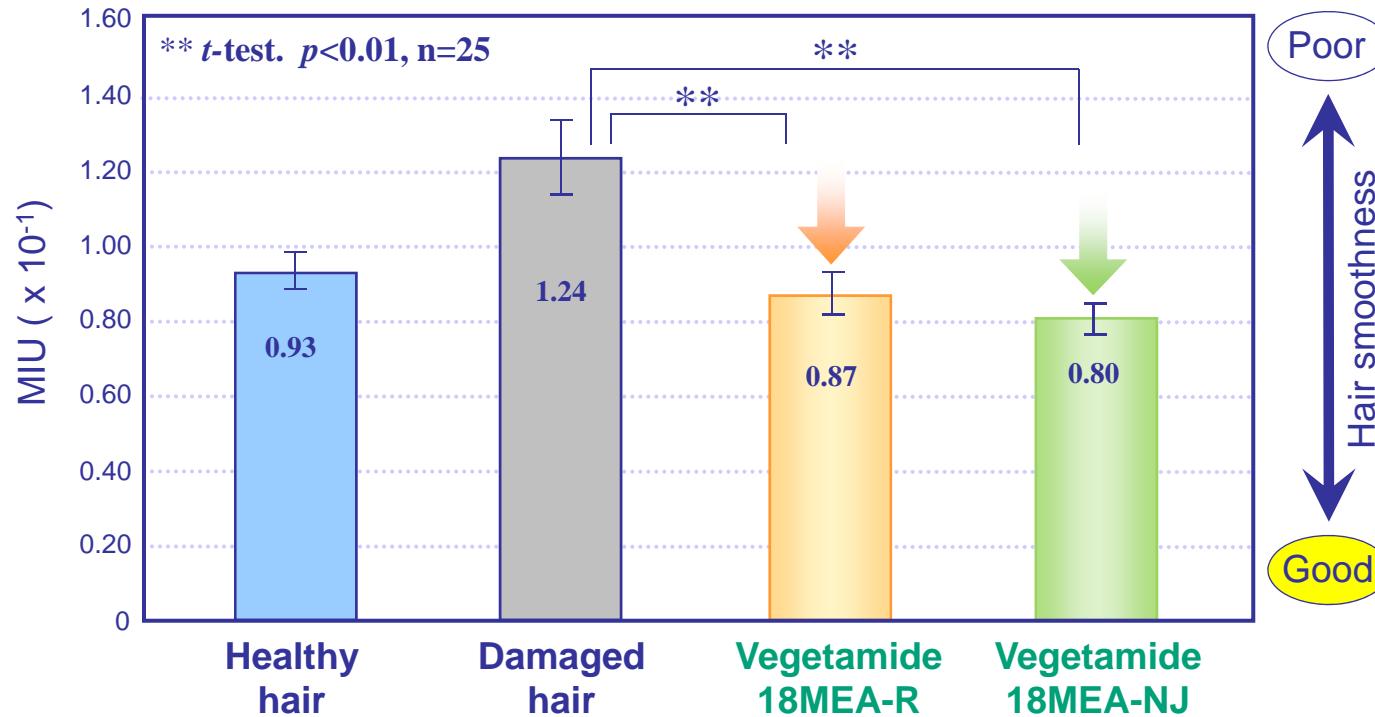
1. Appearance of cuticle [SEM observation]



Vegetamide repairs the cuticle lift-up of damaged hair.

3 Repairing effects

2. Friction of hair surface [Measurement of dynamic frictional coefficient]



Instrument: Friction tester (KES-SE (STP)) (Kato tech, Japan)

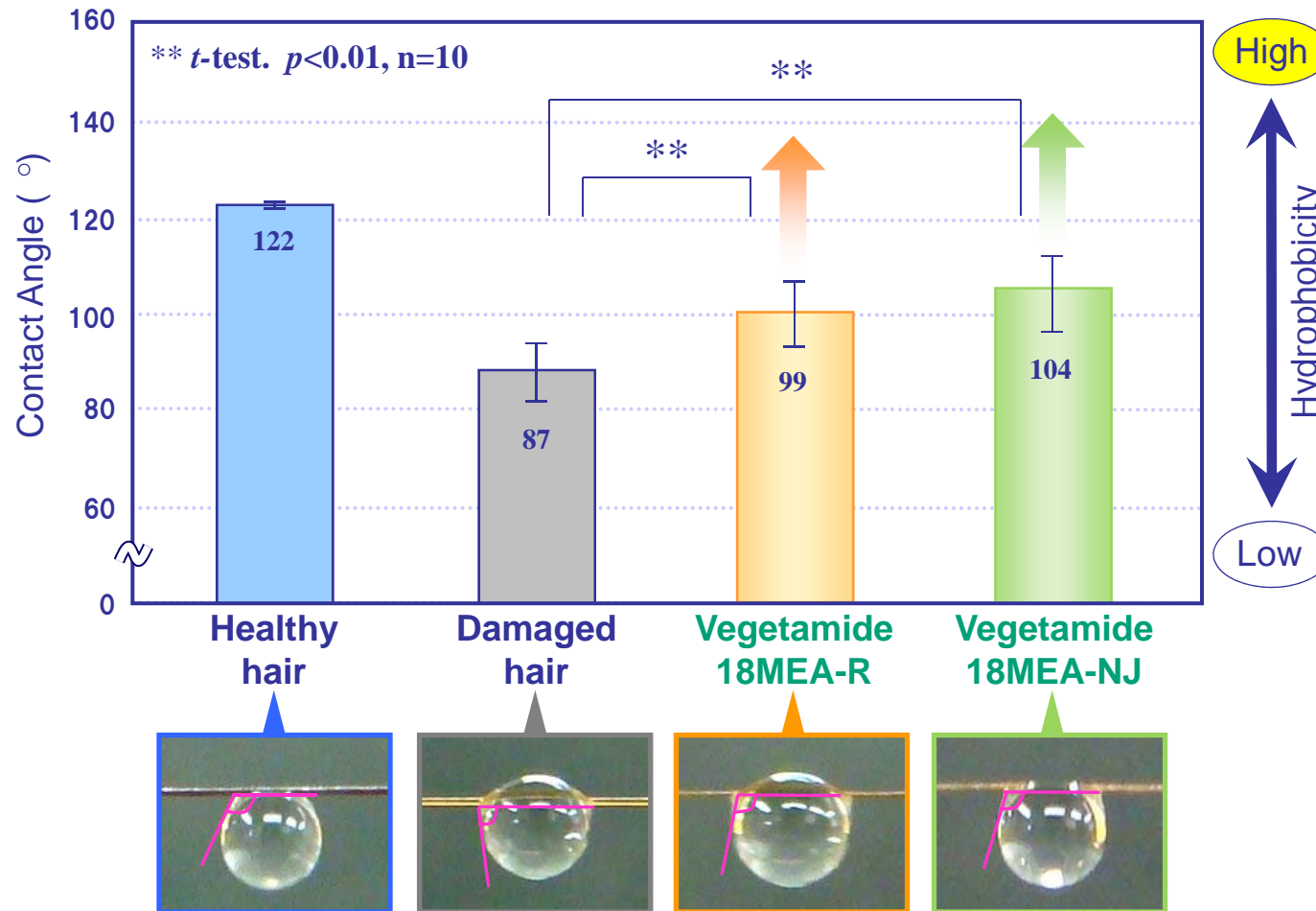
Evaluation method:

Twenty hair fibers were individually and parallelly fixed on the center of glass plate, and the frictional sensor unit was put on the root of hair fiber and moved toward the tip of hair fiber, and the averaged frictional coefficient of hair surface was recorded during the movement of sensor.

Vegetamide improves the poor smoothness of damaged hair surface.

3 Repairing effects

3. Polarity of hair surface [Measurement of contact angle]



Vegetamide recovers the hydrophobic barrier of the hair surface.

3

Repairing effects

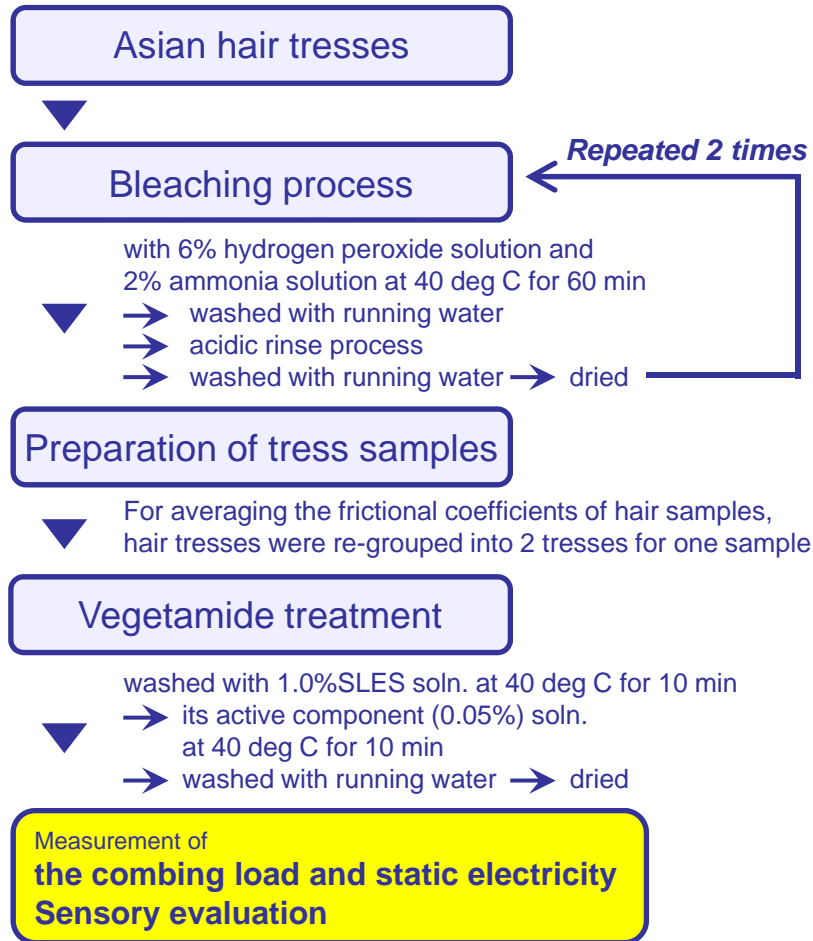
4. Hair combing and static electricity character

[Measurement of the average loading value and static electricity]



5. Sensory texture [Sensory evaluation]

● Method



● Combing test condition



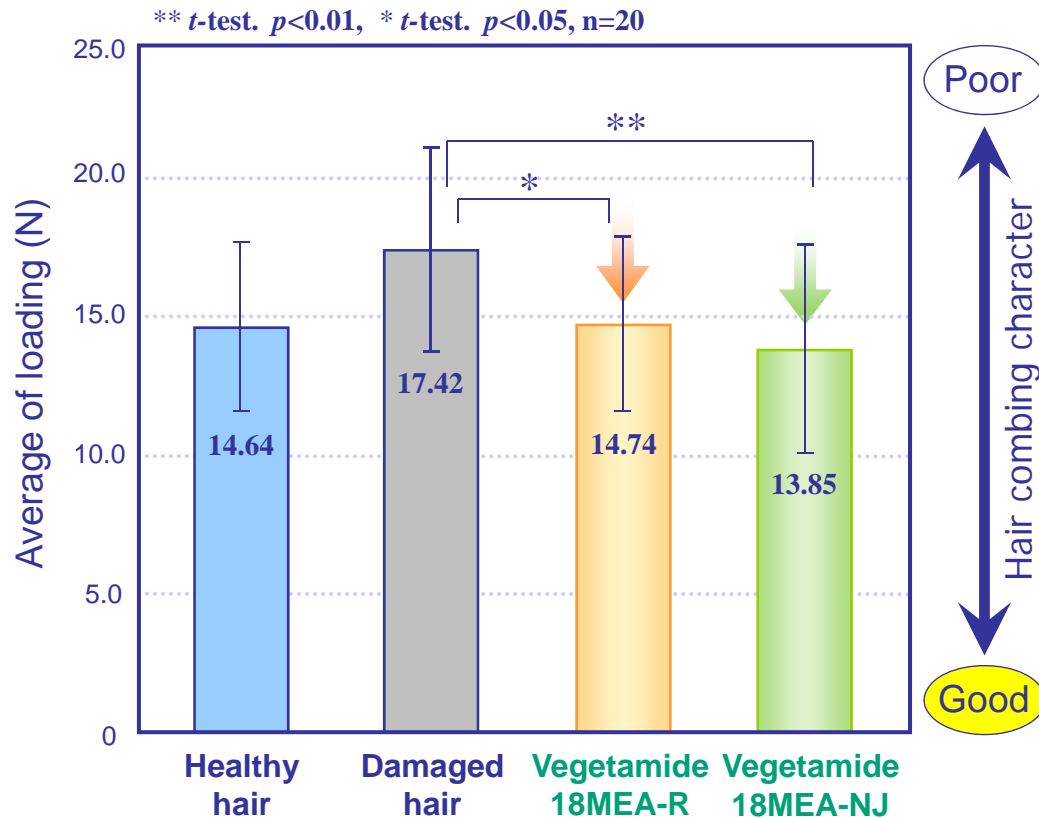
Instrument: Combing tester (Techno Hashimoto, Japan)
Measurement temperature and humidity:
20-22 deg C and 46-53%
Two tresses were used for one sample,
and the measurement was repeated 10 times for one tress.

3

Repairing effects



4. Hair combing character [Measurement of the combing load]



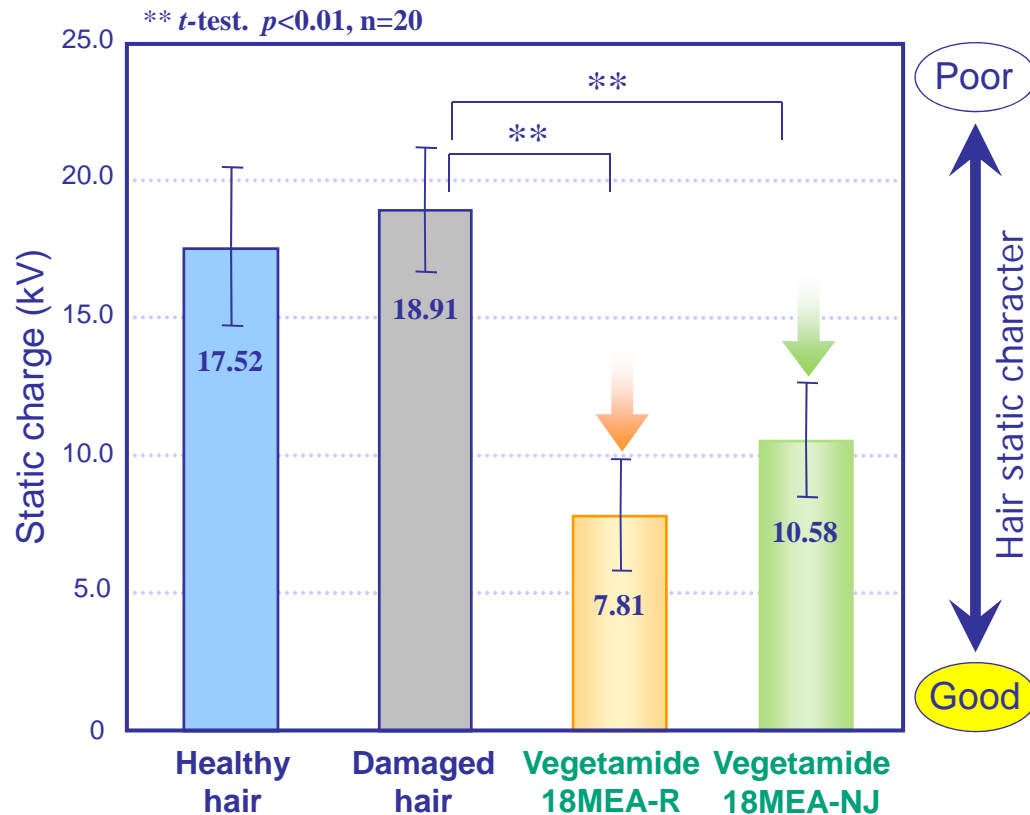
Vegetamide improves the combing character of damaged hair by complementing cuticle structure.

3

Repairing effects



4. Hair static electricity character [Measurement of the static electricity]



Hair tresses after hair combing treatment

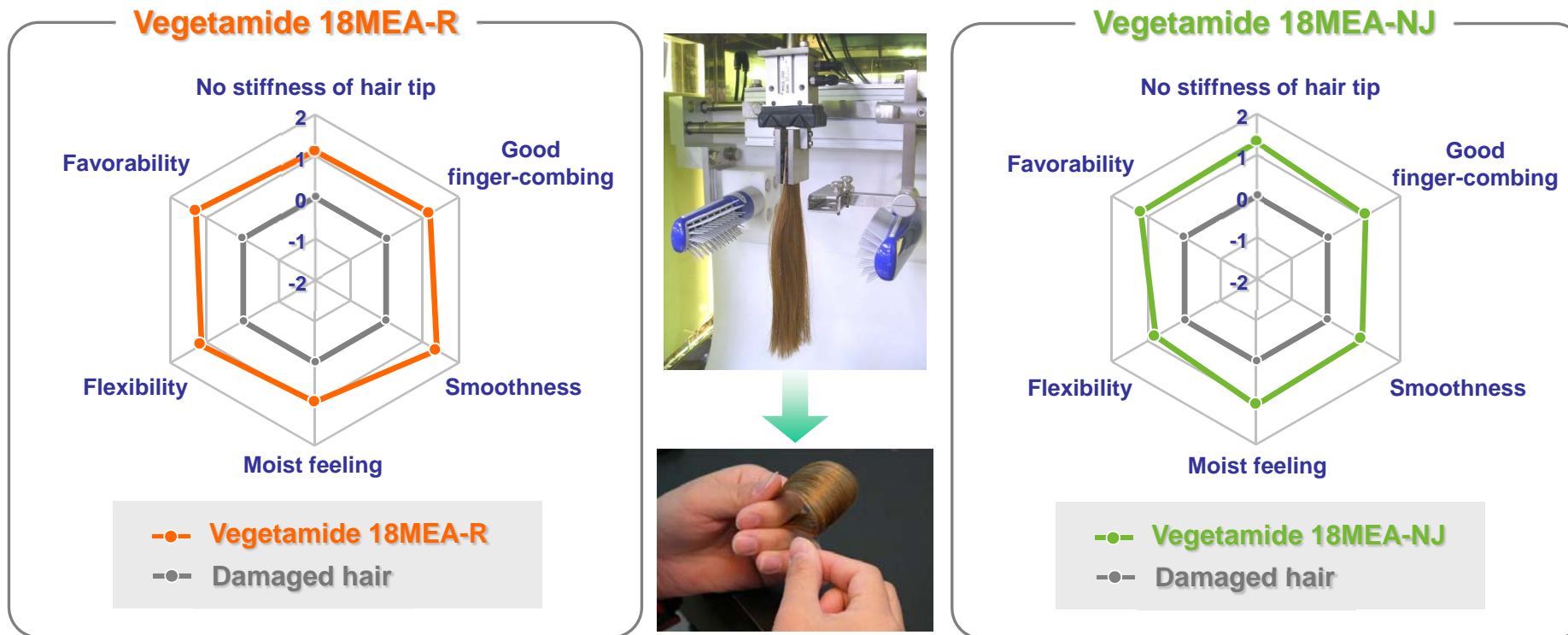


Vegetamide has static removing effect and prevent the spread of damaged hair.

3

Repairing effects

5. Sensory texture [Sensory evaluation]



Evaluation method

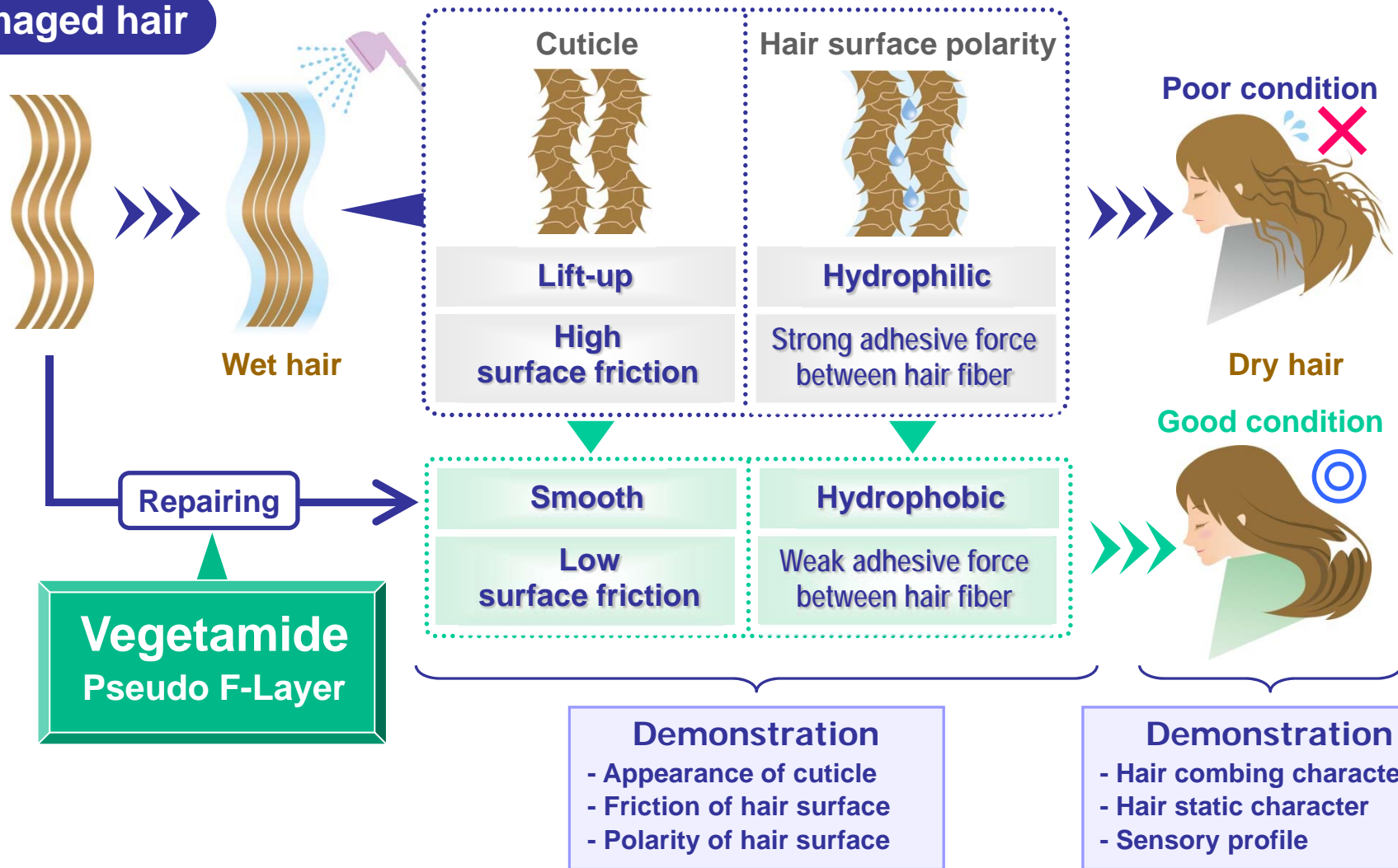
Hair tresses used in combing and static electricity measurements were used in this evaluation. Control hair tress (damaged hair tress) was given 0 point as the base point for each evaluation item, and experienced panels graded the evaluating items of treated hair and gave from -2 to +2 points to the items (n=20). The averaged points of each items were plotted on graphs.

Vegetamide improves the miserably reduced sensory character of damaged hair.

3 Repairing effects

Improvement of consumers' distress by damage

Damaged hair





Applications for cosmetics

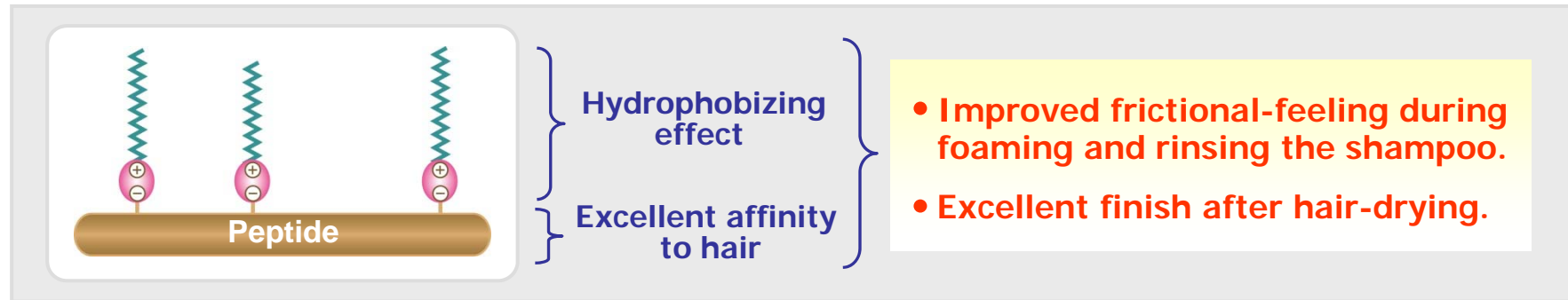
Confirming the efficacy of Vegetamide

- *For Shampoo*
- *For Hair conditioner*
- *For Hair mist*

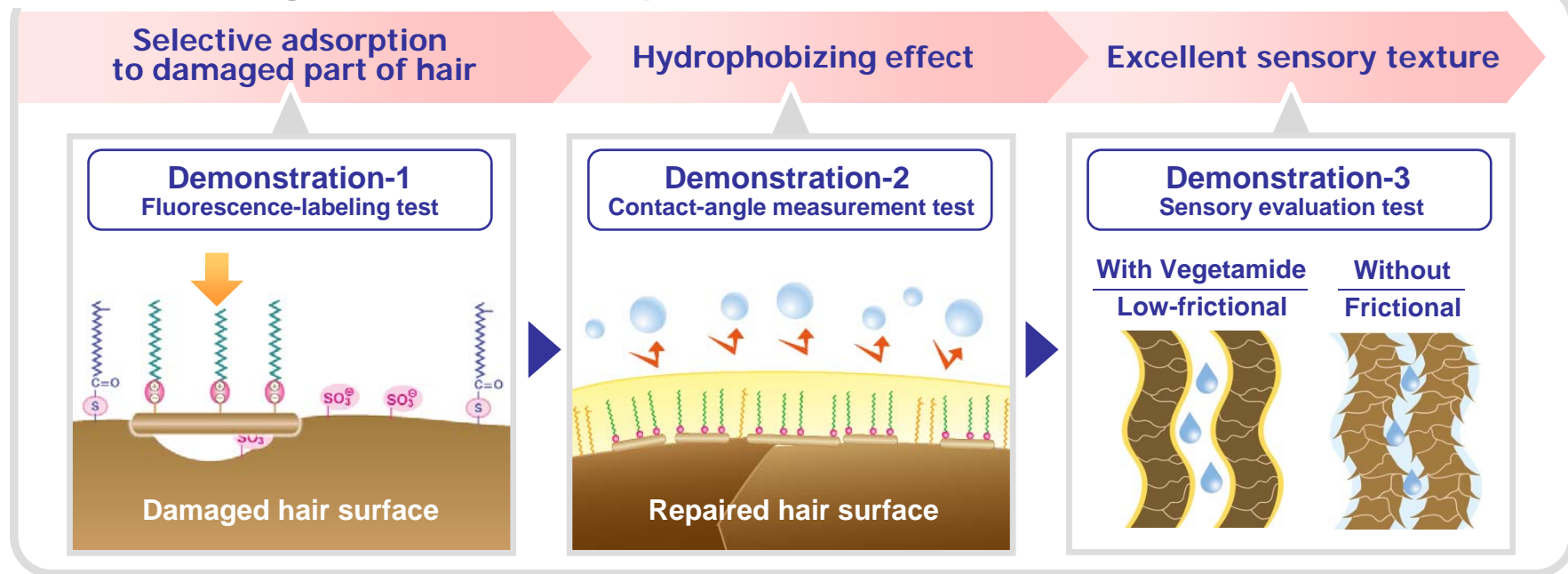


4 Application

Shampoo - Mechanism -



Effects of Vegetamide in shampoo



4

Application

Shampoo - Adsorption to hair surface -

● Test formulae

Demonstration-1

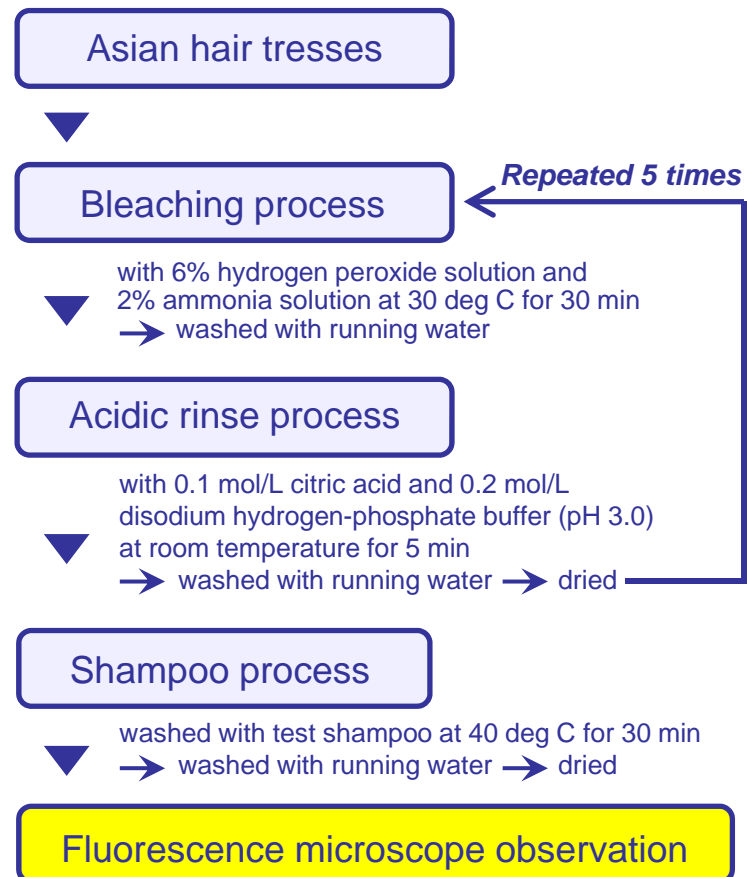
Fluorescence microscope observation of hair surface treated with shampoo containing fluorescence-labeled Vegetamide 18MEA-NJ was conducted.

Shampoo	(w/w %)	
	Control	Vegetamide 18MEA-NJ
Fluorescence-labeled Vegetamide 18MEA-NJ *	-	5.00 **
Sodium Laureth Sulfate	7.50	7.50
Cocamidopropyl Betaine	3.00	3.00
Cocamide DEA	3.00	3.00
Polyquaternium-10	0.20	0.20
Preservative	0.30	0.30
Citric Acid	0.05	0.05
Water	up to 100	up to 100

* Labeled with FL (fluorescein) group and DNS (dansyl) group.

** Concentration of active component.

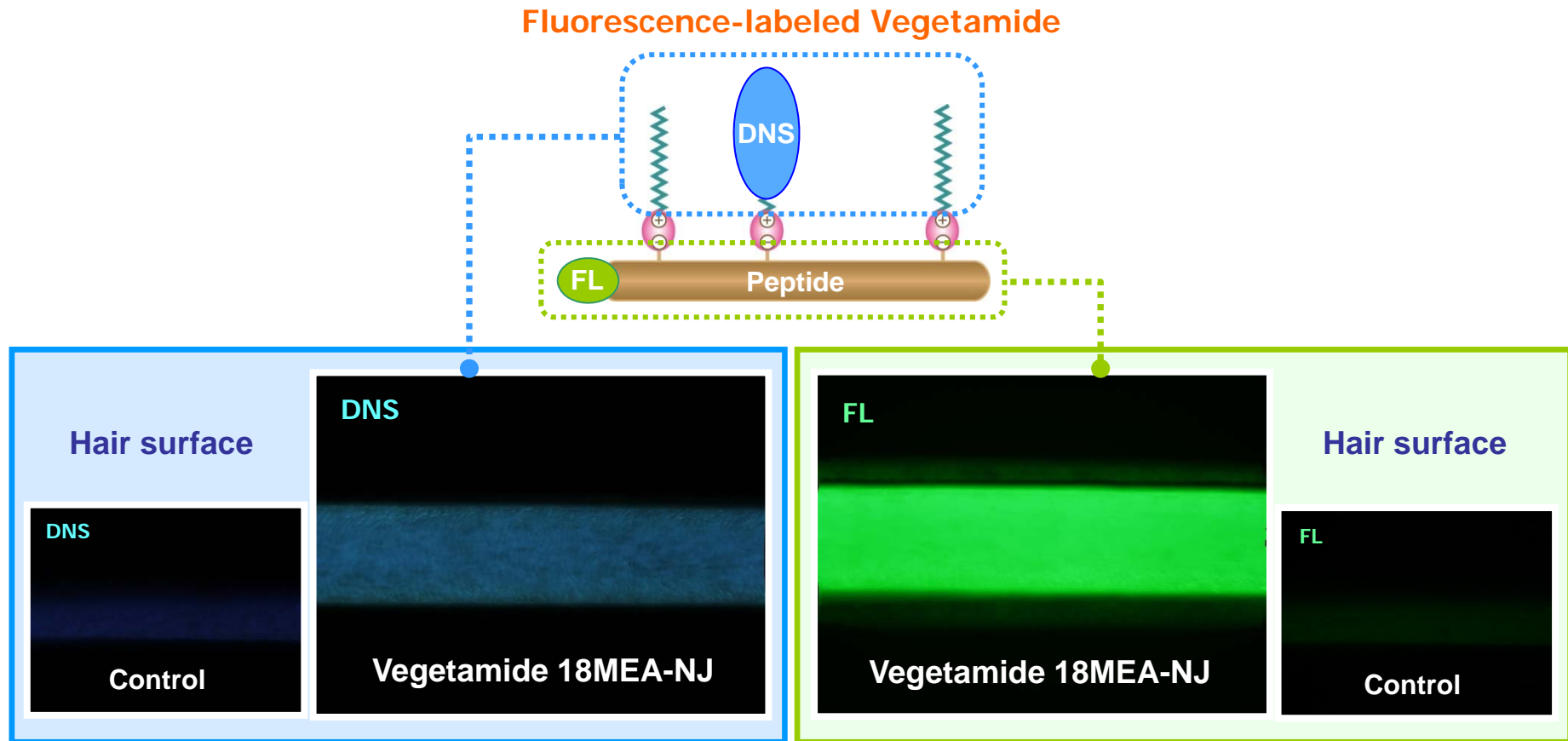
● Method



4

Application

Shampoo - Adsorption to hair surface -



Vegetamide selectively adsorbs on the damaged part of hair surface in case it was formulated in shampoo.

4

Application

Shampoo - Hydrophobizing effect of hair surface -

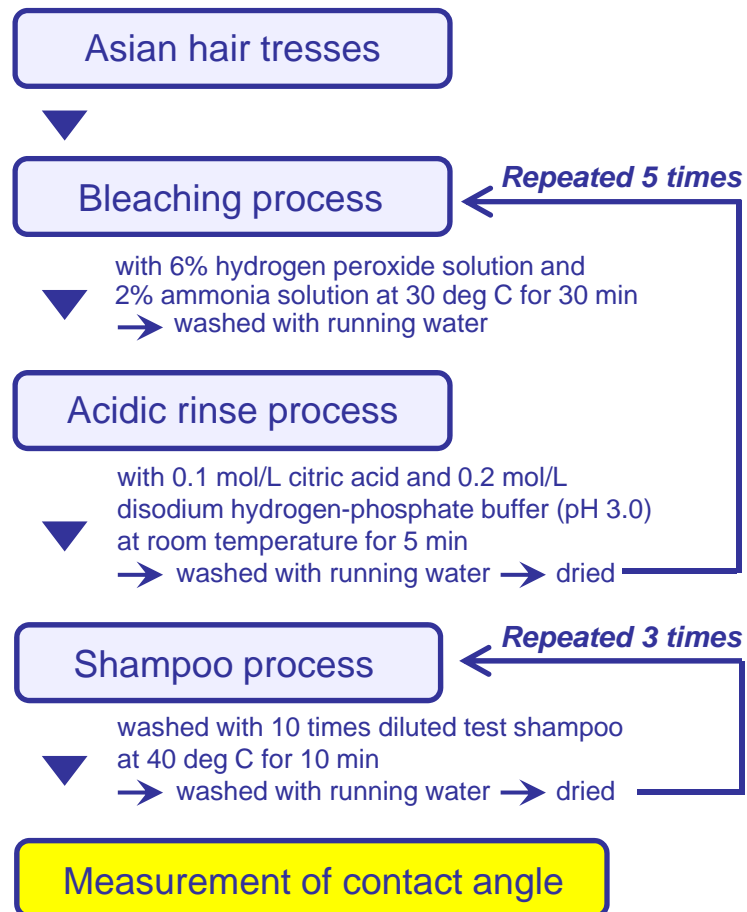
● Test formulae

Demonstration-2

Measurement of contact angle of water droplet on hair treated with shampoo containing Vegetamide 18MEA-NJ was conducted.

Shampoo	(w/w %)	
	Control	Vegetamide 18MEA-NJ
Vegetamide 18MEA-NJ	-	0.50
Sodium Laureth Sulfate	7.50	7.50
Cocamidopropyl Betaine	3.00	3.00
Cocamide DEA	3.00	3.00
Polyquaternium-10	0.20	0.20
Preservative	0.30	0.30
Citric Acid	0.05	0.05
Water	up to 100	up to 100

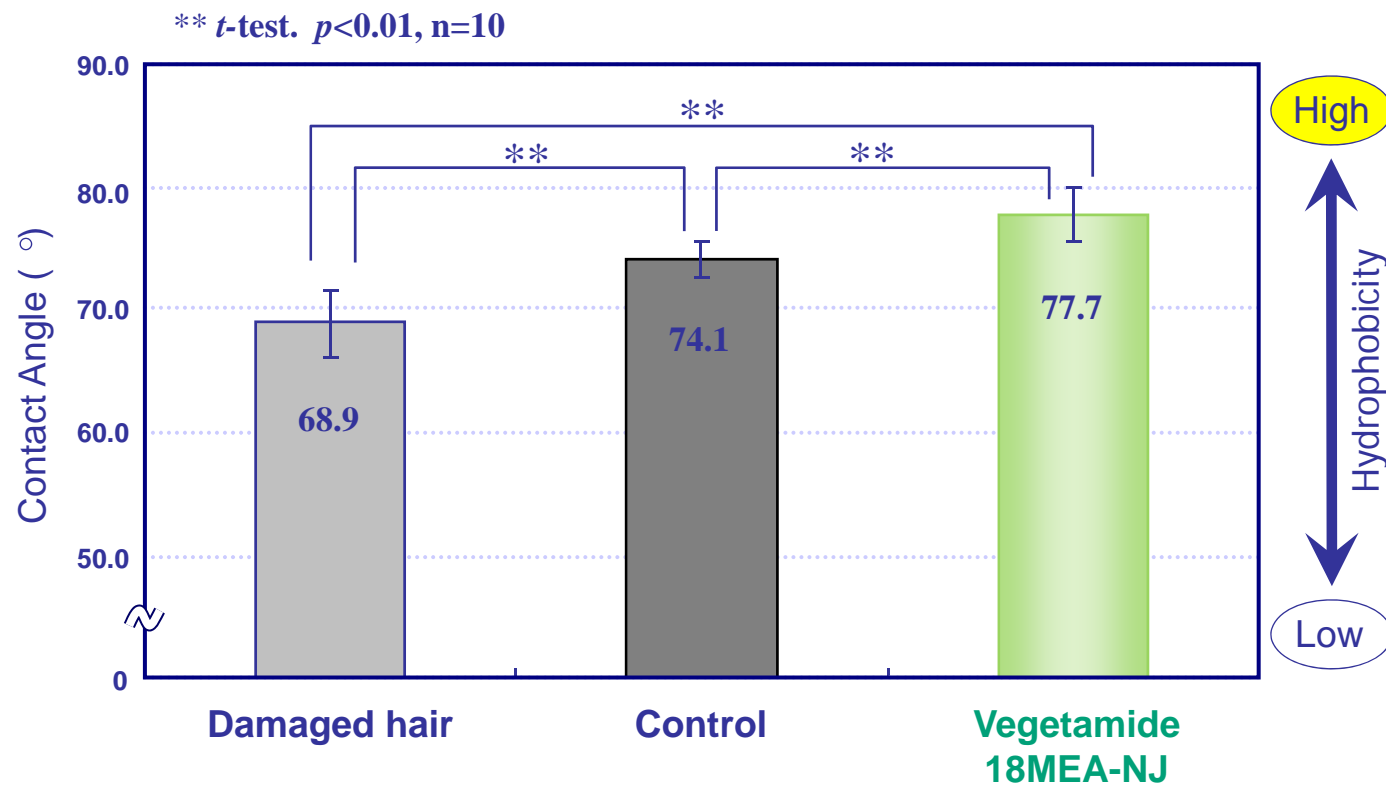
● Method



4

Application

Shampoo - Hydrophobizing effect of hair surface -



Shampoo containing Vegetamide improves the hydrophobicity of damaged hair surface.

4

Application



Shampoo - Sensory texture enhancement -

● Test formulae

Demonstration-3

Sensory evaluation of hair treated with shampoo containing Vegetamide 18MEA-NJ was conducted.

Shampoo	(w/w %)	
	Control	Vegetamide 18MEA-NJ
Vegetamide 18MEA-NJ	-	0.50
Decyl Glucoside , Water *	3.00	3.00
Sodium Laureth Sulfate	6.25	6.25
TEA-Cocoyl Alaninate	1.50	1.50
Cocamidopropyl Betaine	4.50	4.50
Cocamide DEA	3.50	3.50
Polyquaternium-10	0.60	0.60
PPG-25 Diethylmonium Chloride	0.30	0.30
Preservative	0.50	0.50
Fragrance	0.20	0.20
Water	up to 100	up to 100

* ORAMIX NS 10 (SEPPIC)

● Method

18 Panels; Half-head test

Shampoo process

Sensory evaluation-1

During foaming, rinsing and towel drying process.

Hair dry

Sensory evaluation-2

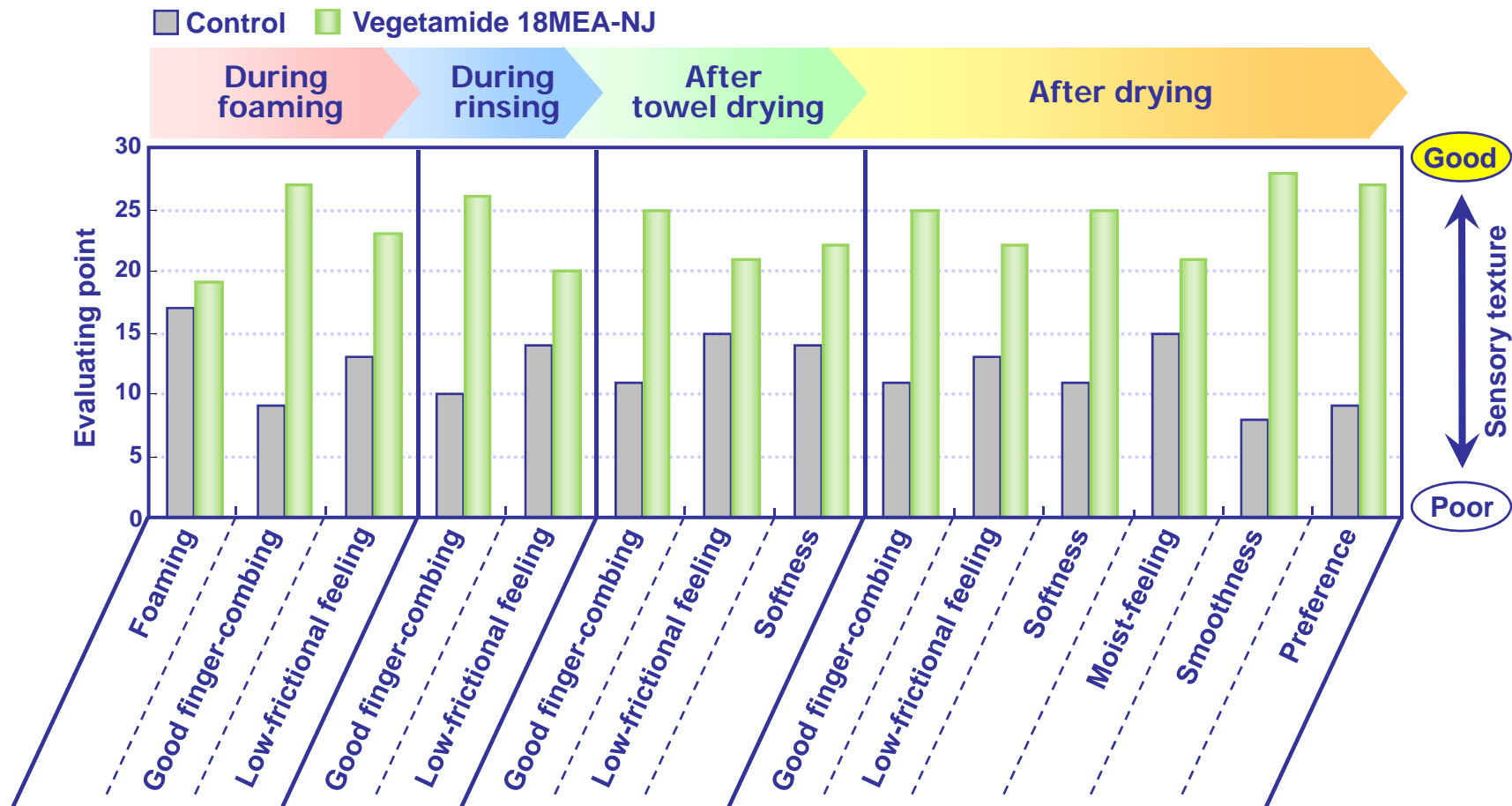
After drying.

Evaluation method

Half-head test was conducted by 18 Japanese panels. 2 point was given to better one, and 1 point was given when evaluated each items as equal, 0 point was given to poor evaluation about each evaluating items (n=18). The sum of the points were plotted on graph.

4 Application

Shampoo - Sensory texture enhancement -



Hair treated with shampoo containing Vegetamide has good sensory texture from beginning to end.

4

Application



Hair conditioner part.1

● Test formulae

Sensory evaluation of the hair wig treated with hair conditioners containing Vegetamide was conducted.

Hair conditioner	(w/w %)		
	Control	Vegetamide 18MEA-R	Vegetamide 18MEA-NJ
Vegetamide 18MEA-R	-	1.00	-
Vegetamide 18MEA-NJ	-	-	1.00
Steartrimonium chloride	0.38	0.38	0.38
Cetearyl alcohol	3.00	3.00	3.00
Steareth-20	1.00	1.00	1.00
Glycerin	1.50	1.50	1.50
Triethylhexanoin	1.50	1.50	1.50
Preservative	0.30	0.30	0.30
Water	up to 100	up to 100	up to 100

● Method

Asian hair tresses



Preparation of damaged hair

- with 1-time bleaching and permanent treatments
- washed with running water

SLES washing



- 25%SLES soln. 1.0g /section

Hair conditioner treatment

- hair conditioner 8.0g /section
- washed with running water
- dried

Sensory evaluation

4

Application

Hair conditioner part.1



Evaluation method

Control hair was given 0 point as the base point for each evaluation item, and experienced panels graded the evaluating items of treated hair and gave from -2 to +2 points to the items (n=10). The averaged points of each items were plotted on graphs.

Vegetamide exerts excellent hair conditioning effect even formulated in hair conditioner.

4

Application

Hair conditioner part.2

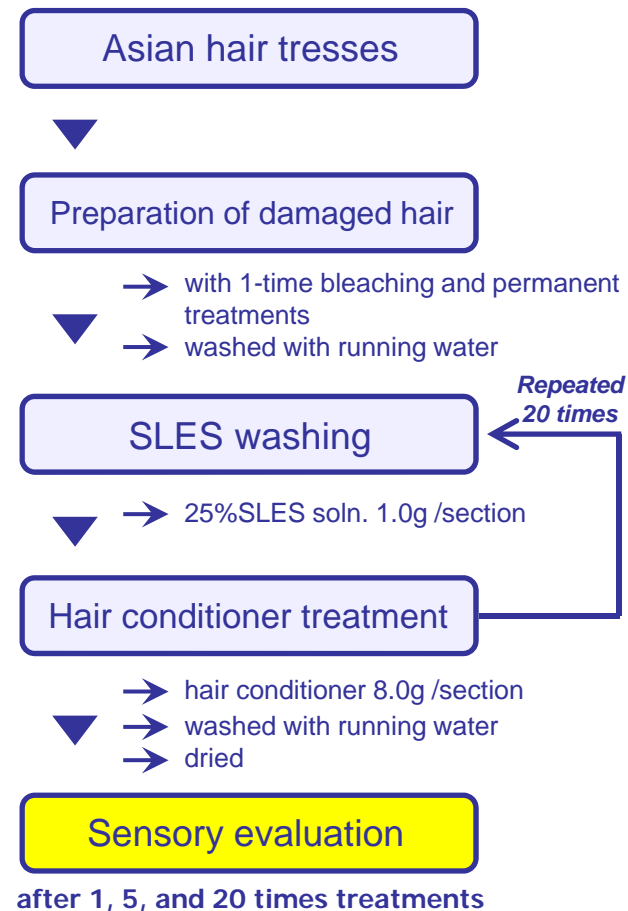
● Test formulae

Sensory evaluation of the hair wig treated with hair conditioners containing Vegetamide or silicone was conducted.

Amodimethicone used as hair conditioning ingredient in cosmetics, was prepared as the benchmark in this experiment.

Hair conditioner	(w/w %)		
	Control	Silicone	Vegetamide
Vegetamide 18MEA-R	-	-	1.00
Amodimethicone	-	0.50	-
Stearyltrimonium chloride	0.38	0.38	0.38
Cetearyl alcohol	3.00	3.00	3.00
Steareth-20	1.00	1.00	1.00
Glycerin	1.75	1.75	1.50
Triethylhexanoin	1.50	1.50	1.50
Preservative	0.30	0.30	0.30
Water	up to 100	up to 100	up to 100

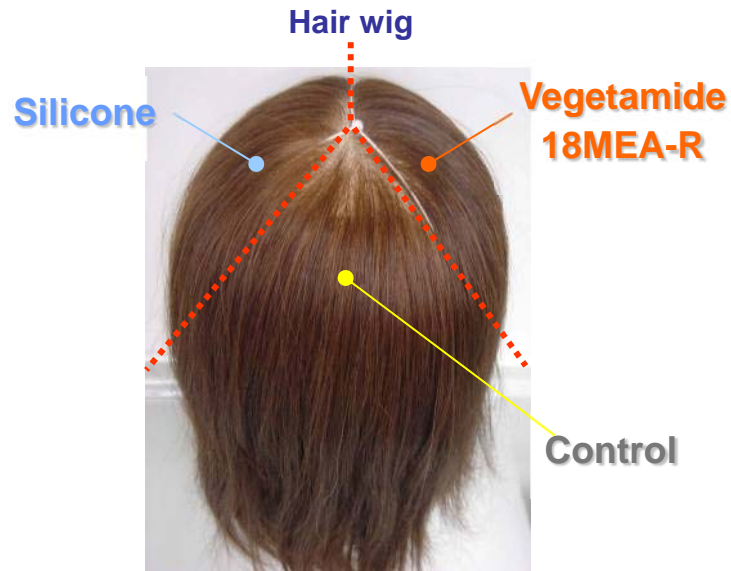
● Method



4

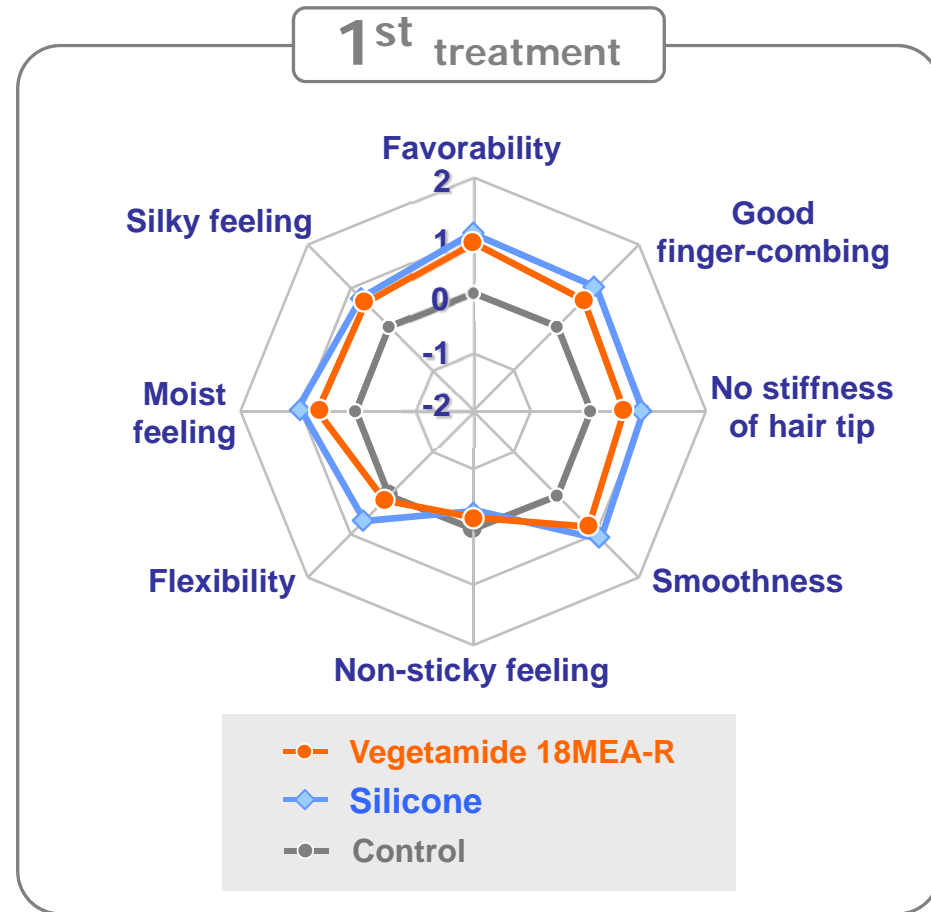
Application

Hair conditioner part.2



Evaluation method

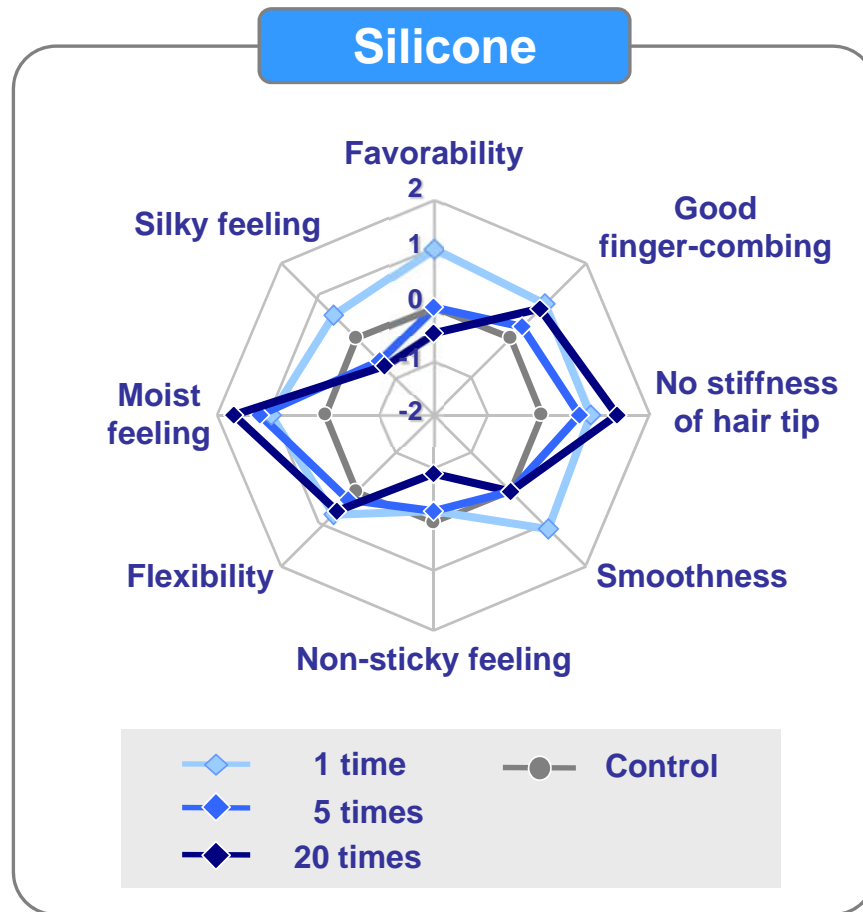
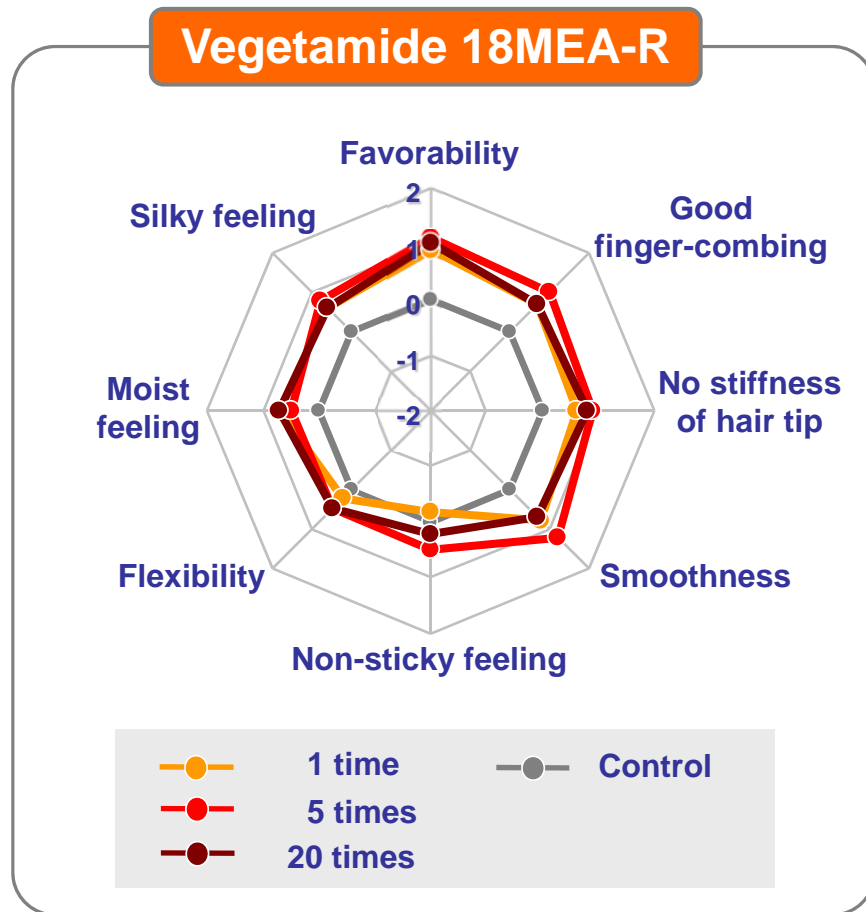
Control hair was given 0 point as the base point for each evaluation item, and ten experienced panels graded the evaluating items of treated hair and gave from -2 to +2 points to the items (n=10). The averaged points of each items were plotted on graphs.



Vegetamide improves the sensory texture of the hair.

4 Application

Hair conditioner part.2

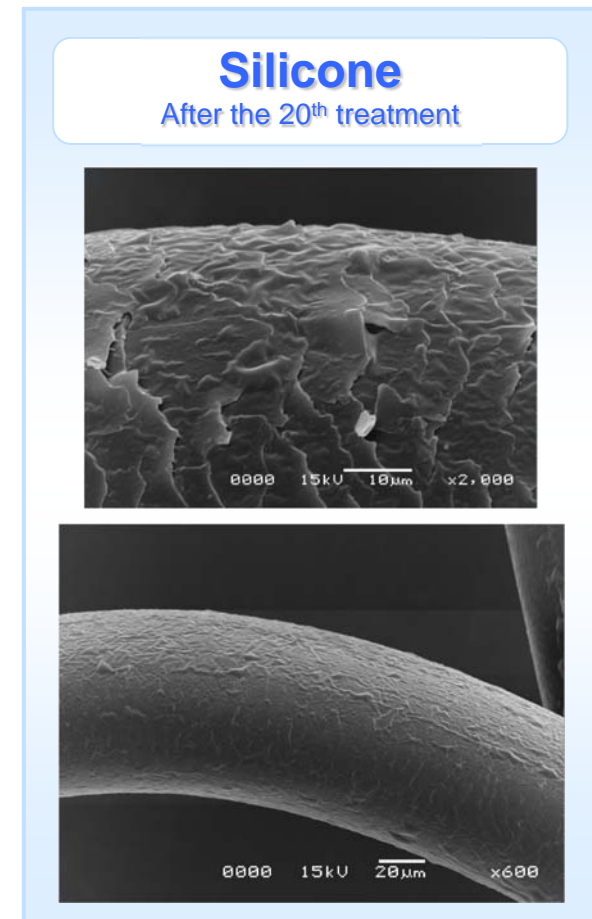
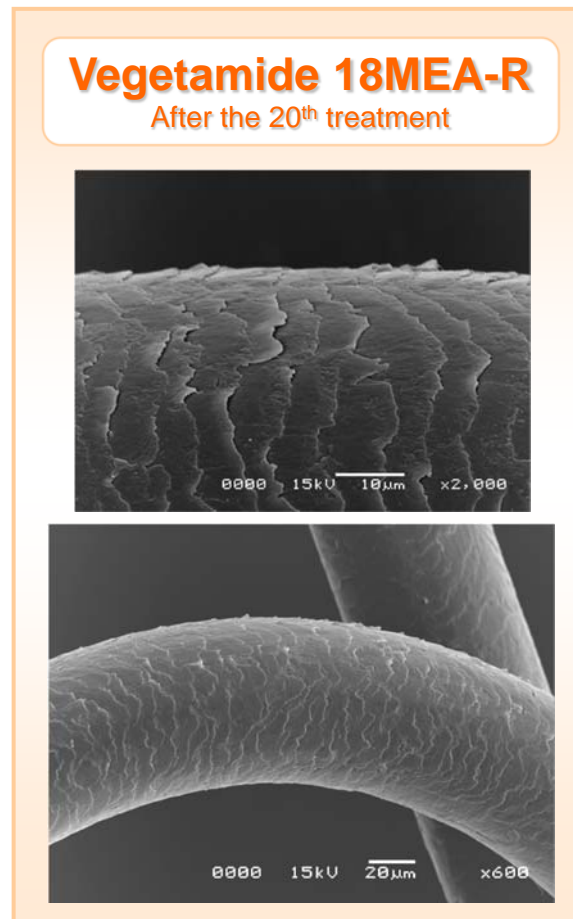
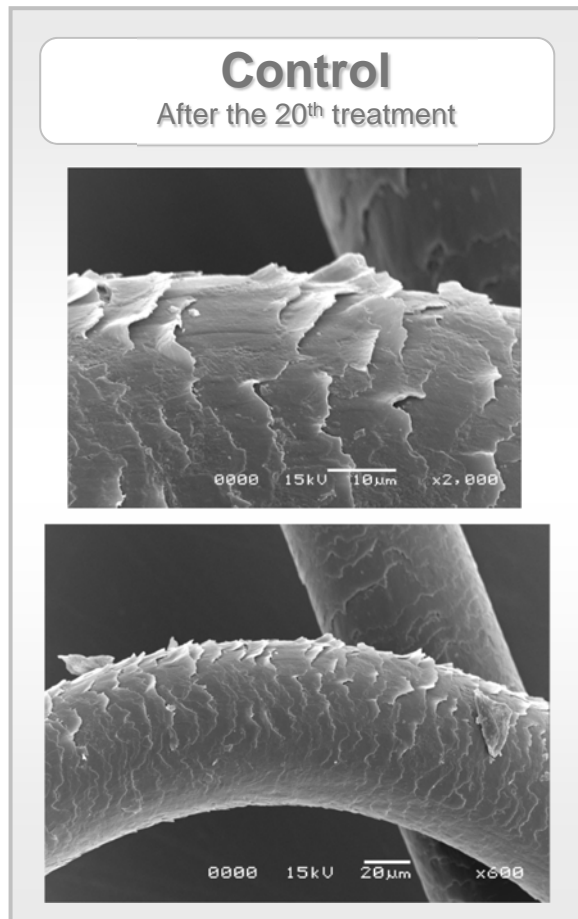


Vegetamide keeps good-balanced sensory character to the hair in daily use.

4

Application

Hair conditioner part.2



**Vegetamide repairs cuticle lift-up
and restructures hair surface to natural state in daily use.**

4

Application

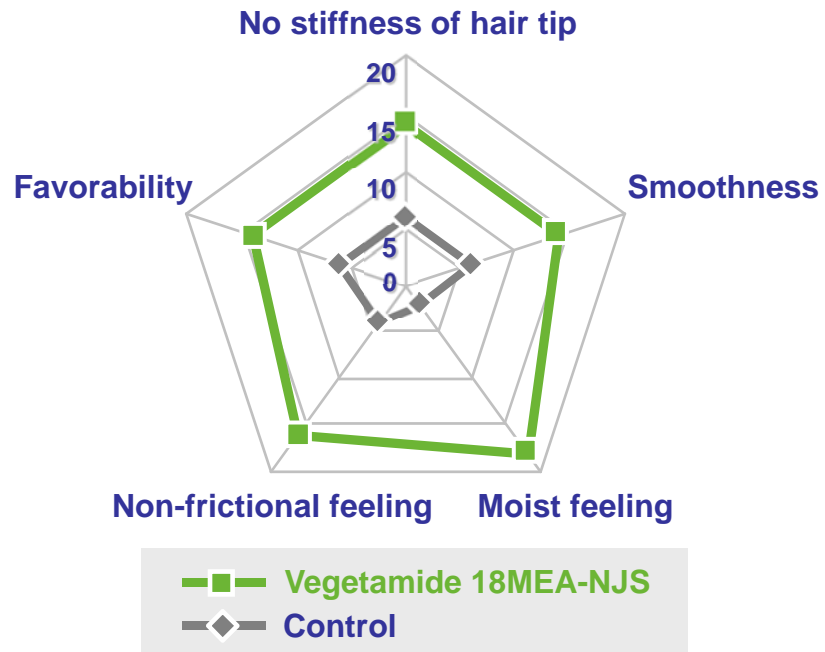
Hair mist

● Test formulae

Sensory evaluation of hair treated with hair mist containing Vegetamide 18MEA-NJS was conducted.

Hair conditioner	(w/w %)	
	Control	Vegetamide 18MEA-NJS
Vegetamide 18MEA-NJS	-	1.0
Alcohol	5.0	5.0
Butylene Glycol	2.0	2.0
Steareth-20	0.3	0.3
Phenoxyethanol	0.5	0.5
Water	up to 100	up to 100

● Sensory evaluation



Evaluation method

Damaged hair tresses treated with Control or Vegetamide hair mist were prepared. Panels graded the evaluating items of hair tresses and gave +2 point to the hair tresses having better impression and gave +1 point in case having equal impression (n=10). The total points were plotted on graph.




Vegetamide improves the sensory character of damaged hair even formulated in hair mist.



Summary

Vegetamide



-  - has superior selective adsorption ability to damaged part of hair surface.
-  - works as pseudo cuticle F-layer and improves the function of hair surface reduced by damage.
-  - allows to develop many kinds of hair-care formulae that provides excellent sensory texture all day long.





Product information



Vegetamide 18MEA-R

INCI Name	18MEA-R
Cetearamidoethyl Diethonium Hydrolyzed Rice Protein	50%
Glycerin	25%
Water	25%



Vegetamide 18MEA-NJ Vegetamide 18MEA-NJS

INCI Name	18MEA-NJ	18MEA-NJS
Cetearamidoethyldiethonium Succinoyl Hydrolyzed Pea Protein	45%	7%
Glycerin	35%	25%
Water	20%	68%

Pea isn't regarded as food allergens required to be labeled under the CODEX* and food regulation of USA, EU and Japan.

* CODEX, the Codex Alimentarius Commission, is an intergovernmental body developing food standards, guidelines and codes of practice under the Joint FAO/WHO Food Standards Programs.

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