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## **Development of Novel Cosmetic Ingredient that Protects the Skin and Hair from External Stimulating Factors and Has Antibacterial Activity ~ FANCL and Nippon Shokubai Succeeded in the Joint Development ~**

NIPPON SHOKUBAI CO., LTD. (Head quarter : Osaka-city, Japan, President: Yujiro Goto, hereinafter “Nippon Shokubai”), and FANCL Corporation (Head quarter: Naka-ku, Yokohama City, Japan, President & CEO, Representative Director: Kazuyuki Shimada, hereinafter "Fancl") have jointly developed the novel polymer that prevents fine particles, such as airborne pollen and PM 2.5 from adhering to the skin and hair, and has antibacterial / antiviral activity. The novel polymer is also found to have a moisturizing effect on skin and hair, and it is expected to be applied to cosmetics intended to gently protect skin and hair from various external stimulating factors.

It is known that intercellular lipids contained in the stratum corneum of human skin has water retaining property and barrier function. Fancl and Nippon Shokubai focused on the fact that intercellular lipids are composed of both hydrophilic and hydrophobic groups and have designed the novel polymer composed of both hydrophilic monomers and hydrophobic monomers. Based on this structure, we succeeded in the development of the novel polymer which has both water retaining property and film forming ability by utilizing Nippon Shokubai's polymerization technology.

The developed novel polymer has three main effects as follows. (1) Fine particle adhesion prevention effect: Fine particles such as pollen, dust and PM 2.5 may cause itchiness and rough skin in case of adhering to the skin, and it may cause problems such as decreasing stiffness, hair loss, and hair thinning in case of adhering to the hair. This polymer forms a film on the skin or hair, preventing the generation of static electricity and the adhesion of fine particles to the skin and hair. (2) Moisturizing effect: The novel polymer moisturizes the skin and hair. (3) Antimicrobial / antiviral activity: It has been confirmed that the polymer has antibacterial activity and antiviral activity against influenza virus which is a kind of envelope virus. It is expected to keep the surface of your skin and hair cleaner.

Cosmetics containing this polymer are expected to protect the skin and hair from fine particles, protect them from their damage caused by various external factors, and provide moisture.

A part of the results will be announced jointly with Fancl at the 140th Annual meeting of the Pharmaceutical Society of Japan (Announced March 2020) and the IFSCC Congress 2020 Yokohama.

Figure 1. Pollen Adhesion Inhibitory Effect against artificial skin

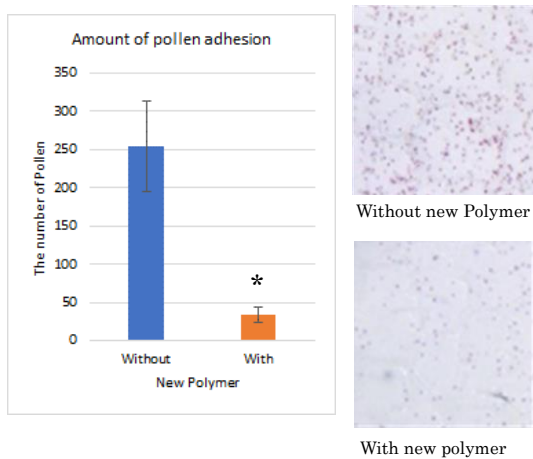
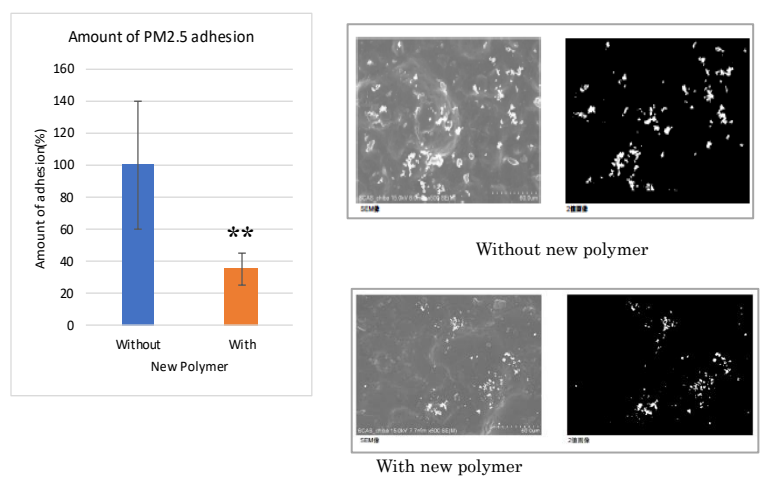


Figure 2. PM 2.5 Adhesion Inhibitory Effect against artificial skin



(\* p < 0.01 (VS. Not applied))

(\* \* P < 0.05 (VS. Not applied))

Table -1. MIC test results

Unit: ppm	Species tested	
	<i>Escherichia coli</i>	<i>Staphylococcus aureus</i>
New polymer	16	31
Polyethyleneimine	400	200
Polyacrylic acid	>50,000	>50,000

### Terminology Description

PM 2.5: Small particles of 2.5 μm or less floating in the air.

*Escherichia coli*: A bacterium that lives in the large intestine of humans and animals.

*Staphylococcus aureus*: A species of *Staphylococcus* that is a normal organism in the skin and digestive tract of humans and animals

MIC: Minimum inhibitory concentration is the lowest concentration of an antimicrobial that will inhibit the visible growth of a microorganism.

p-value: Probability of obtaining test results as extreme as the results actually observed.

The lower the p-value, it shows that more significant the difference can be.

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About NIPPON SHOKUBAI Co., Ltd.: Since 1941, Nippon Shokubai has grown up its business with unique catalyst technology. Nippon Shokubai has supplied, for example, ethylene oxide, acrylic acid, automobile catalysts, process catalysts and so on. Among all, our global market share of superabsorbent polymer is the largest in the world now. Nippon Shokubai is a global chemical company operating under its corporate mission "TechnoAmenity-Providing affluence and comfort to people and society with our unique technology." <https://www.shokubai.co.jp/en/>

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