

## Shiseido Develops New Method for Testing Indigenous Skin Bacteria

~ Pursuing the best skincare solution for each customer's "current skin condition" ~

Shiseido Company, Limited ("Shiseido") has developed a new testing method to measure the amount and balance of indigenous skin bacteria in a simple and easy way in a short time through collaboration with YAMATO-ESULON Co.\*1, Ltd. and ORCOA Co., Ltd.\*2. In most cases, it takes nearly one month to obtain the results of indigenous skin bacteria tests conducted as a service for consumers because it requires a specialized analysis after collecting the samples. With the application of a compact, simplified PCR\*3 testing device, anyone can easily obtain test results in about 40 minutes, allowing them to know the status of their indigenous skin bacteria onsite. This leads to a high-value-added in-store experience and a new beauty service.

As one of the "Individual/Universal" approaches based on our R&D philosophy "DYNAMIC HARMONY", we tried to develop a method to easily grasp the state of indigenous skin bacteria, which varies between individuals, using the vast amount of data accumulated over years from our research on indigenous skin bacteria. Currently Shiseido plans to launch a "unique skin bacteria" measuring service using this testing method on a trial basis for visitors at the Shiseido Global Innovation Center (called "S/PARK"), a research and innovation hub located in the Minato Mirai area in Yokohama, Japan.

\*1 YAMATO-ESULON Co., Ltd. <http://yamato-esulon.co.jp/english/>

\*2 ORCOA Co., Ltd. <https://orcoa.jp/> (Japanese only)

\*3 PCR: Polymerase Chain Reaction. A chemical reaction to amplify the genes of living organisms including viruses and bacteria.

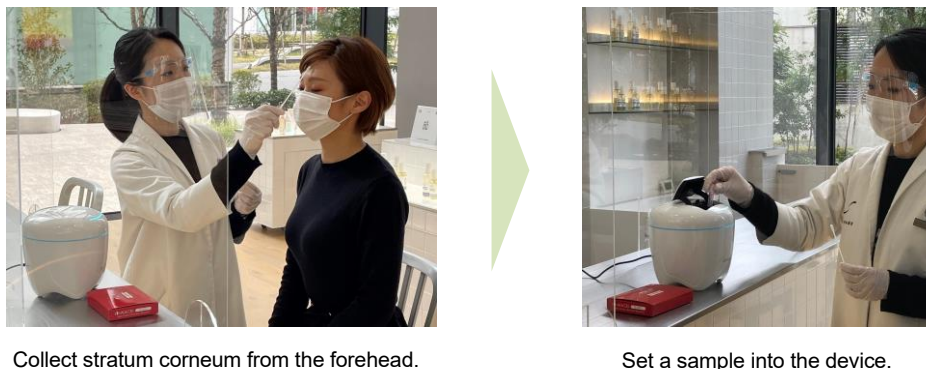


Figure 1. Newly developed method to examine indigenous skin bacteria.

### Research background

It is said that about 1,000 types of indigenous bacteria exist in the skin, and it has recently been revealed that there is a relationship between the type and balance of these bacteria and the beauty and health of the skin. In our previous research, we found that the indigenous bacterial diversity is low in sensitive skin and that prebiotic ingredients\*4 improve skin texture and moisture level\*5. Now, we have applied these findings to the development of our cosmetics and skin measurement systems. Generally, the indigenous skin bacteria tests offered to consumers require advanced and specialized experimental techniques, analysis technologies, and large testing devices, and it takes about one month to complete, from collecting samples to obtaining the results, including transportation. Thus, we tried to realize a versatile use of the technology to examine indigenous skin bacteria in a bid to propose even more optimal skincare through analyzing the current status of one's indigenous skin bacteria and combining it with the advanced

counseling services of our beauty consultants who work closely with each consumer, which is one of our strengths.

<sup>4</sup> Prebiotic ingredients: A combination of ingredients including Saccharomyces extract. While it is expected to increase beneficial bacteria that have beneficial effects on the skin, it does not affect the growth of harmful bacteria.

<sup>5</sup> Shiseido Discovers Sensitive Skin is Low in Skin Microbiome Diversity

<https://corp.shiseido.com/en/news/detail.html?n=0000000002960>

#### Development of a new method for testing indigenous skin bacteria

In this research, we collaborated with YAMATO-ESULON Co., Ltd., and ORCOA Co., Ltd., which have developed and sell devices for detecting periodontal disease bacteria. We have succeeded in detecting the types and amounts of indigenous skin bacteria in a simple and easy manner by applying the device. With these efforts, it has become possible to obtain results in a short time of about 40 minutes, with no restriction in location and no special skills. This time, we specially targeted to measure the two types of indigenous bacteria; *Staphylococcus epidermidis* and *Propionibacterium acnes*, which are strongly suggested to be related to the beauty and health of the skin and confirmed that the amount and balance of these bacteria are equivalent to the results of those being examined with a conventional method (16S rRNA amplicon analysis<sup>6</sup>). As a consequence, we have established a highly accurate and versatile method for testing indigenous skin bacteria.

<sup>6</sup> 16S rRNA amplicon analysis: A method to determine the profile of bacterial composition in a sample by sequencing a part of 16S rRNA-coding in the bacterial genome.

#### Future prospects

Shiseido aims to realize new skincare solutions by understanding the skin as an ecosystem in which skin cells and microbes coexist. With this technology, we wish to offer opportunities for our customers to deepen their understanding of indigenous skin bacteria, which play an important role in the beauty and health of the skin. Furthermore, by combining with the advanced counseling services of our beauty consultants, which are one of our strengths, we would like to provide people with optimal, personalized skincare solutions according to their current skin conditions.

We have developed a variety of measuring and evaluation technologies and have studied the skin of many consumers. Going forward, Shiseido will further develop these technologies to gain a deeper understanding of consumers, aiming to realize our goal of being a “PERSONAL BEAUTY WELLNESS COMPANY”.

#### Shiseido's R&D philosophy “DYNAMIC HARMONY”

Shiseido Formulates its Unique R&D philosophy “DYNAMIC HARMONY” (2021)

<https://corp.shiseido.com/en/news/detail.html?n=0000000003252>

The DYNAMIC HARMONY special website:

<https://corp.shiseido.com/en/rd/dynamicharmony/>

## The Researchers' Challenge

### ■ The Challenge to elucidate skin problems from a new angle

There is a growing number of consumers claiming their skin is affected by changes in physical condition, season, and environment, etc., and we felt the need to take a fresh look at the skin from a new angle that differs from conventional skincare. Thus, we focused on indigenous skin bacteria, which have recently been strongly suggested to be related to skin health.

We also thought that it is important for us to help people understand the condition of their own skin and use skincare products based on their own understanding of their skin condition, in addition to providing knowledge about indigenous skin bacteria and related products. We needed a way to analyze and visualize the state of indigenous skin bacteria that depicts each one's "current skin condition".



Chief Researcher, Nakako Shibagaki

### ■ Technological evolution through open innovation

Conventional measurement requires about one month to complete, from collecting samples from a consumer to obtaining the results. In response to consumers' request of knowing their "skin condition as it is now", we took on the challenge of downsizing the device, reducing analysis time, and developing a simple testing method that can be handled by non-specialized staff so that the results can be delivered while the consumer is in a store. In particular, rapid analyses require advanced technology and a large testing device, so we needed to find a partner who has a compact device and can demonstrate simple processing and rapid analysis, simultaneously.

We found out that the periodontal disease bacteria analyzers owned by YAMATO-ESULON Co., Ltd., and ORCOA Co., Ltd. are compact, small enough to be placed in a clinic, allowing medical staff to perform tests on site and obtain the results while the patient is in the clinic. By combining Shiseido's technological expertise in indigenous skin bacteria research with the compact device, which can be placed in a storefront, and its testing process being so simple to operate that no specialists are required, we have achieved a rapid analysis time of approximately 40 minutes. We believe that we can provide new services that will further satisfy consumers by offering together with the counseling techniques of beauty consultants in store.

### ■ Thoughts on indigenous skin bacteria research

It is known that the characteristics of indigenous skin bacteria vary from strain to strain even in the same species and that their properties change depending on the surrounding environment of commensal bacteria. Therefore, we will not only analyze the types and numbers of bacteria, but also conduct more elaborate research in order to develop new personalized skincare that takes advantage of the individuality of diverse bacteria each one has, introducing future skincare solutions that will support people in achieving their ideal skin.