

**Mandom has succeeded in quantifying the amount of sebaceous matter produced in human sebaceous gland and has established a new evaluation method**

~ “Application of the evaluation method to demonstrate the sebum-suppressing effect of phytic acid” ~

Mandom Corporation (headquarters: Osaka City, President & CEO: Motonobu Nishimura; hereinafter referred to as “Mandom”), through the Laboratory of Advanced Cosmetic Science (between Mandom and Osaka University Graduate School of Pharmaceutical Sciences, hereafter referred to as “joint-research course”), is engaging in research on the sebaceous gland to develop a product that can more effectively control sebum secretion by directly acting on human sebaceous glands.

In this joint-research course, we have succeeded in viewing the three-dimensional structure of human sebaceous glands and have elucidated that new sebum (oil droplets) is generated in the outermost cells of the glands.

We have succeeded in quantifying the amount of sebum (oil droplets) produced in human sebaceous glands, which has allowed us to establish a new method of evaluation. Using this method, we were able to identify the sebum-suppressing effect exhibited by phytic acid (\*) contained in rice milk, on human sebaceous glands.

The results of this research will be presented at the 24<sup>th</sup> Congress of International Federation of Societies of Cosmetic Cosmetics (IFSCC) in Seoul (October 23 to 25, 2017).

### **1. Success in quantifying the amount of sebum (oil droplet) formation in human sebaceous glands**

In our research work to date, we have succeeded in observing a three-dimensional view of the sebaceous glands in human skin tissue (approved by the ethical review board) and have elucidated that new sebum (oil droplets) forms on the outermost cells of human sebaceous glands when treated with existing sebum-promoting reagents. However, we were unable to objectively and quantitatively evaluate and compare the amount of sebum formed.

As we were able to detect the number of sebum (oil droplets) contained in the outermost cells using three-dimensional images observed in an analysis software, quantifying the amount of sebum formed (Figure 1) was deemed possible.

Therefore, an evaluation of sebum formation in near in-vivo conditions could be performed. Using the method of evaluation generated, we believe it is possible to explore and develop materials that can exhibit beneficial effects in human sebaceous glands.

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**2. Authentication that phytic acid suppresses sebum (oil droplet) formation in human sebaceous glands**

Sebum production in human sebaceous glands was evaluated by defining the degree of sebum production as the number of sebum (oil droplets) produced in the outermost cells, divided by the volume of the outermost cells. We confirmed that treating sebaceous glands with existing sebum-promoting reagents significantly increased the amount of sebum produced. Furthermore, we showed that sebum formation was significantly suppressed by the simultaneous addition of phytic acid (Figure 2); phytic acid has been proven to exhibit sebum-suppressing effect in human trials conducted by Mandom.

This result suggests that sebum secretion is suppressed by the action of phytic acid on human sebaceous glands which subsequently reduce the amount of sebum present on the skin.

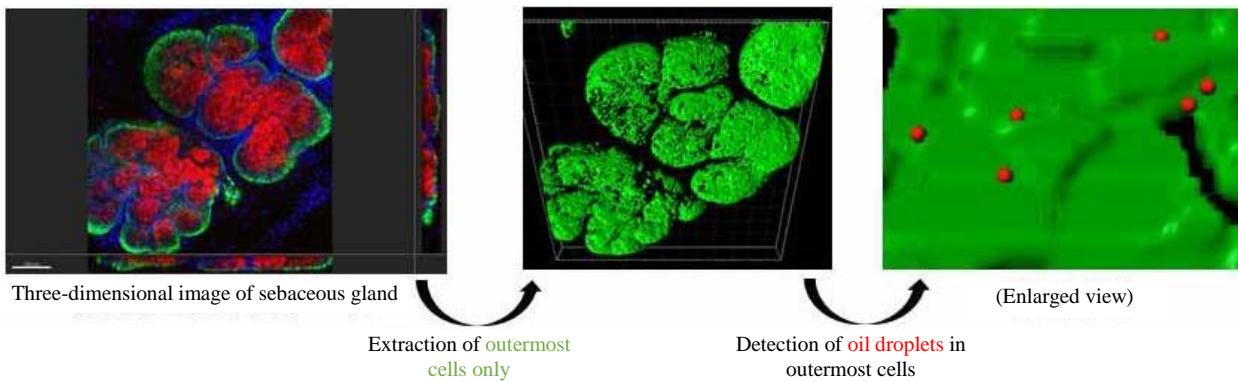
Mandom will continue to use its resources to study the sebaceous gland. By establishing more evaluation methods and elucidating the mechanism of action, we hope that our findings will be useful to individuals that suffer from skin conditions caused by sebum.

\*Phytic acid, a component of “Rice Milk,” has recently gained popularity as a Super Food.

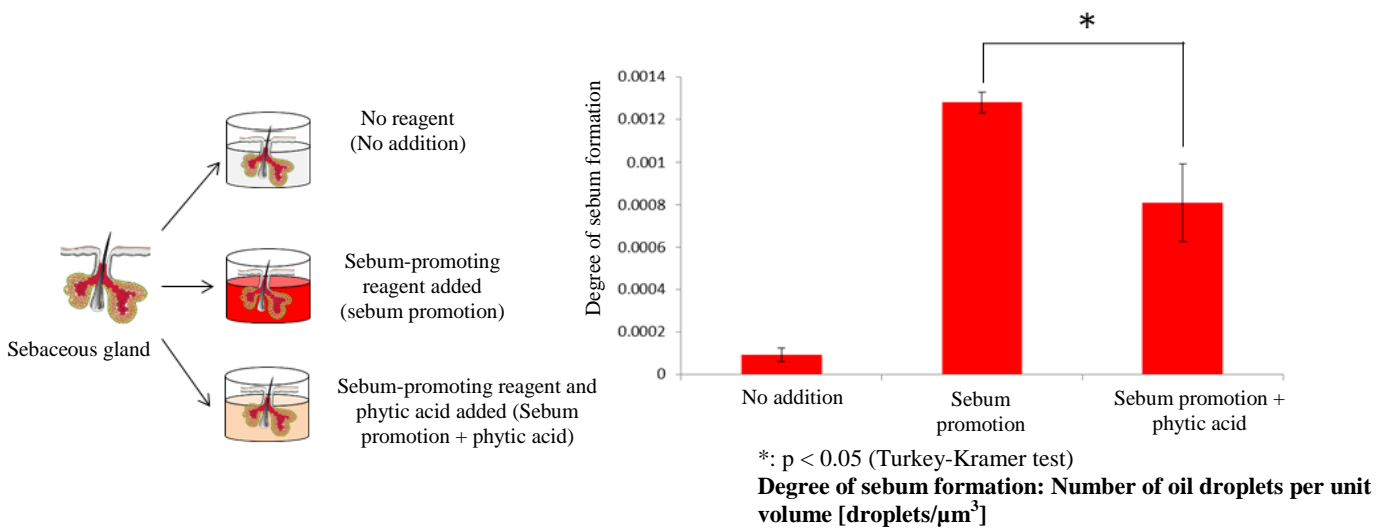
[Reference Materials]

**Figure 1. Detection of Sebum (oil droplets) in the outermost cells of sebaceous glands**

Sebum; Outermost cells; Nucleus



**Figure 2. Suppression of sebum formation in sebaceous glands by phytic acid**



## [Reference News Release]

- **Release concerning phytic acid**

Mandom discovers that the skin of women aged 30 changes based on their menstrual cycle and is temporarily degraded during the hyperthermic phase  
(News Released on November 21, 2016)

- **Release concerning sebaceous glands**

Mandom has successfully observed a three-dimensional view of human sebaceous glands and has established a unique method to evaluate sebum secretion  
(News Released on May 10, 2017)

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