

## Discovery by Mandom of “Cooling Keeper” ingredient that provides a prolonged cooling sensation of $\ell$ -menthol

- Adding to this Spring’s new deodorants-

Mandom Corporation (HQ: Osaka City, President Executive Officer & Director: Motonobu Nishimura, hereinafter: Mandom) is focused on improving both comfort and function of cosmetics and quasi-drugs, and has been studying the “various factors associated with sensing comfort.”

In this regard, Mandom has previously established a method for a more accurate quantitative evaluation of cooling sensation using subjects in their 20s and 30s that are sensitive to cooling sensation (released June 14, 2007). We found that there was a comfortable range for the strength of cooling sensations and that the range was different depending on the presence or absence of perspiration (released April 10, 2009).

Our research efforts focused on evaluating sustained and comfortable cooling sensations resulted in the discovery of a “Cooling Keeper” ingredient that is able to prolong the cooling sensation.

We are incorporating this “Cooling Keeper” into both “GATSBY Powder Deodorant Aqua” and “GATSBY Ice Deodorant Aqua,” which will be available by February 2011.

We are continuing to pursue technologies focused on improving and maintaining the cooling sensation of our products to allow them to be used more comfortably.

### 1. The “cool” feeling is becoming popular in Japan

In recent years, the use of deodorants has increased due to the growing awareness of male hygiene and cleanliness. In 2010, specifically, the extreme hot weather in Japan led to a favorable shift in the use of deodorant products that claimed to be “refreshing” and “cool.” Many face cleansers and face lotions that provided a cooling sensation were sold.  $\ell$ -menthol is a notable ingredient often used to provide a “cooling sensation.” Another means of providing a cooling sensation is to lower the skin temperature by utilizing the heat of vaporization of ethanol and water. Furthermore, it is also possible to rapidly lower skin temperature using gases, such as liquid petroleum gas (LPG) and dimethyl ether (DME), which are used in aerosol sprays. For use in cooling cosmetics, these techniques were combined to achieve the resultant cooling sensation.

### 2. Too strong of a sensation causes discomfort, while too weak of a sensation is rapidly lost

While a moderate cooling sensation is pleasant, too strong of a cooling sensation can cause a burning sensation that may result in feelings of discomfort. Hence, cooling cosmetics are designed by combining the aforementioned vaporization heat, and by adjusting the proportion of cooling ingredients so that it does not provide discomfort. However, the comfortable cooling sensation that is felt immediately after use is rapidly lost over time. Even though the vaporization heat from ethanol and water lowers the skin temperature, once dry, the effect is lost. Moreover, the effects due to vaporization heat from LPG and DME are also rapidly lost. While the cooling sensation associated with  $\ell$ -menthol and other cooling ingredients also gradually disappears over time, it lasts longer than that of the heat of vaporization, so that use of these cooling ingredients is considered an effective strategy for prolonging the comfortable and cooling sensation. It is important to both prolong the cooling sensation provided by these ingredients, while at the same time suppressing the pain and discomfort that occurs immediately following use.

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**3. Cooling Keeper” prolongs the cooling sensation of  $\ell$ -menthol**

How can the cooling sensation of  $\ell$ -menthol be prolonged? To answer this question, we tested various cosmetic ingredients and found one particular ingredient that did not alter the pain intensity immediately following  $\ell$ -menthol use, but did prolong the cooling sensation. Further testing of the cooling sensation confirmed that this specific “Cooling Keeper” ingredient did not cause a cooling sensation by itself, but that in combination with  $\ell$ -menthol resulted in a prolonged cooling sensation, without increasing the strength of  $\ell$ -menthol (Fig. 1). In addition, we confirmed that the cooling sensation score was significantly higher after 45 minutes based on tests conducted on the abdominal area of male subjects in their 20s to 30s(Fig. 2).

**4. Incorporation of the “Cooling Keeper” into new products for sale in February 2011**

Mandom is adding this “Cooling Keeper” to both “GATSBY Powder Deodorant Aqua” and “GATSBY Ice Deodorant Aqua,” which will be available for sale in February 2011. Mandom will pursue future development to provide deodorant products that are capable of maintaining a comfortable cooling sensation over long periods of time.

<Reference material>

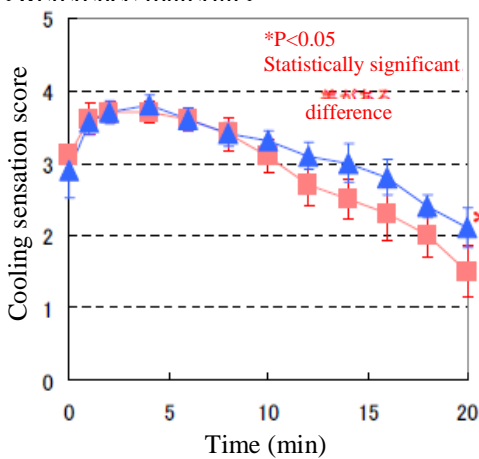


Fig. 1. Changes in cooling sensation of  $\ell$ -menthol-containing lotions  
 ■ : Cooling Keeper added, ■ : No Cooling Keeper added

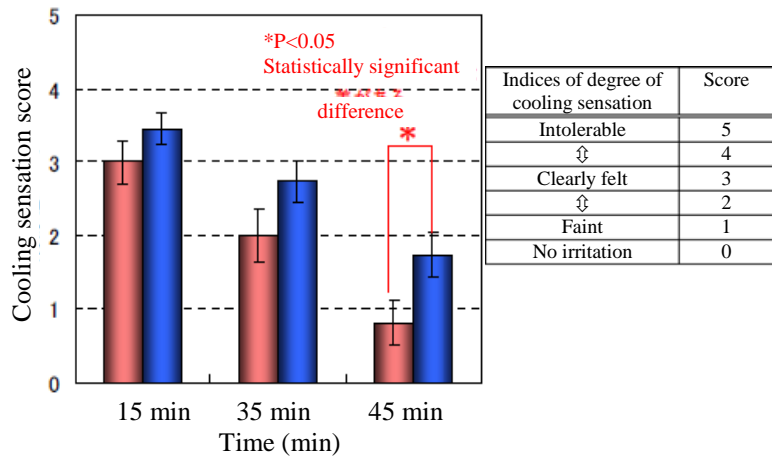


Fig. 2. Cooling sensation score during actual usage tests of abdominal area  
 ■ : Cooling Keeper added, ■ : No Cooling Keeper added

Indices of degree of cooling sensation	Score
Intolerable	5
↕	4
Clearly felt	3
↕	2
Faint	1
No irritation	0