

A Mandom study on “comfortable coolness” and gender differences regarding the cooling sensation

Mandom Corporation (Head Office: Osaka, President Executive Officer: Motonobu Nishimura, hereafter “Mandom”) has been studying the “various factors associated with sensing comfort” in people, while emphasizing both, the usability and function of cosmetics (quasi-drugs).

As part of this, Mandom has evaluated the “cooling sensation” associated with use of such products, through an independently established technique. We identified the comfort range for cooling in men at which unpleasant sensations such as pain or burning are minimal. These findings have been applied to product development.

(Presented at the “The 60th Workshop of the Society of Cosmetic Chemists of Japan (SCCJ)” in June 2007.)

At Mandom, “cooling sensation” is defined as the pleasant feeling, with the person simultaneously feeling “cold” and “refreshed”, but at times include unpleasant sensations such as pain or burning when freshening ingredients are balanced with other ingredients. Women, in particular, are sensitive to a cooling sensation, and thus the majority of products meant for women have reduced cooling. However, women are seeking a strong cooling sensation similar to that used in products targeted for men. Consequently, in this report, we clarify the gender differences in terms of cooling sensation and comfort.

Furthermore, we presented the results of this study at the “62nd Workshop of the Society of Cosmetic Chemists of Japan (SCCJ) Osaka International House Foundation” held on June 18.

[Key research findings]

- ① **Unlike previously thought, women, similar to men, like the cooling sensation of body products.**
- ② **Women have a 'higher sensitivity' to cooling sensations than men.**
- ③ **This depends on the characteristics of the skin of the male or female and females are particularly responsive to a mild sensation.**
- ④ **The comfort zone for cooling sensation differed clearly depending on the gender and the state of skin in the user.**

1. Both men and women prefer products offering a cooling sensation.

In general, women were thought to be very sensitive to cooling sensation. So, it was assumed that products targeted for women did not need to generate a strong cooling sensation. To validate this, 1200 men and women were surveyed to rate the cooling sensation they sought from deodorants (2007). Based on the results, over 70% of the consumers preferred a cooling sensation, regardless of the gender of the participants. A strong cooling sensation is preferred. However, they were also aware that this may lead to an unpleasant sensation in the form of burning or stinging, and that it is not easy to extend the comfortable cooling sensation. Nevertheless, women as well as men apparently prefer a cooling sensation.

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2. Both men and women are able to evaluate cooling sensation

It was previously thought that women, more than men are more sensitive to cooling sensation. Therefore, in order to verify the differences in their ability to evaluate the cooling sensation, we used two types of model lotions differing in ℓ -menthol content, a typical freshening ingredient, on 66 male- and 57 female-subjects. Based on the evaluation results, and after categorizing the subjects according to the criteria in Table 1, we found that women ranked slightly higher for A and B subjects with high evaluations of cooling sensation, but there was no major gender-based differences, and the ability to evaluate cooling sensations was almost similar (Fig. 1).

Table 1 Selection criteria of subjects

Rank	Criteria
A	Very high sensitivity; can correctly discern differences in ℓ -menthol content
B	High sensitivity; can correctly discern differences in ℓ -menthol content
C	Low sensitivity, or cannot correctly discern differences in ℓ -menthol content

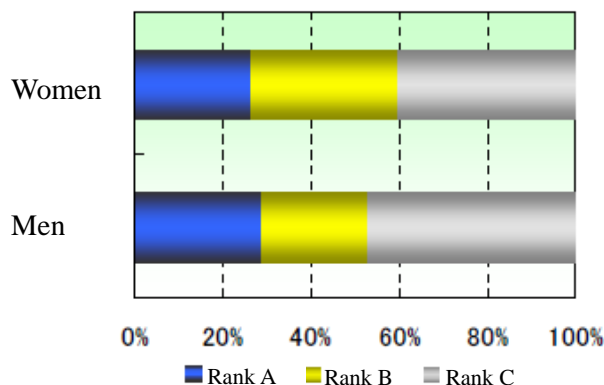


Fig. 1. Distribution ratio of subjects ranked based on their ability to evaluate cooling sensation

3. Gender-based differences in “sensitivity” to cooling sensation.

Women sense cooling sensations strongly compared to men.

We present the results for cooling sensation sensitivity when evaluating the same model lotions (0.3% ℓ -menthol content) with the subjects that have a high ability to evaluate cooling sensations as shown in section 2 (Fig. 2). Despite the lack of major gender differences in the ability to evaluate cooling sensations, when the same samples were evaluated, women tended to rate the cooling sensation higher than men. This difference was particularly prominent for the <Cooling sensation duration> that lasts for a short time immediately after use.

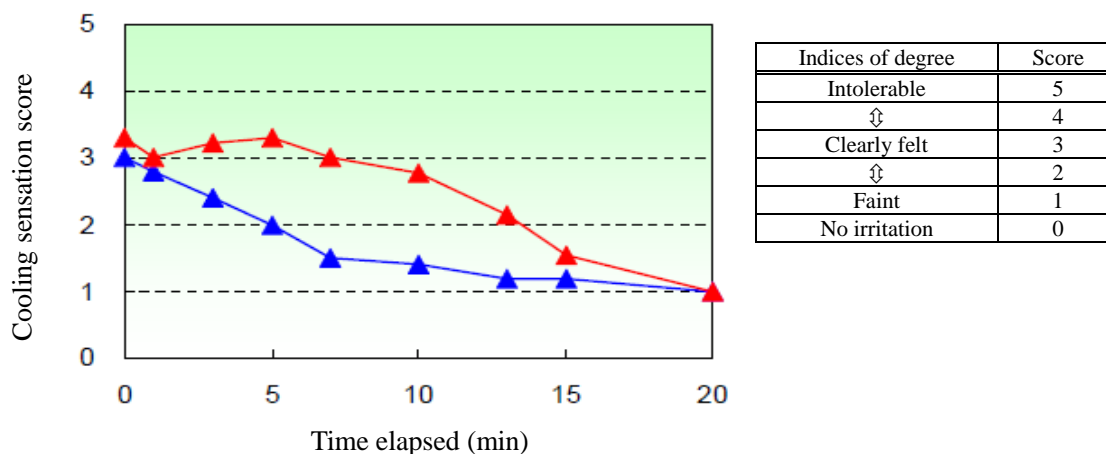


Fig. 2 Cooling sensation strength of 0.3 ℓ -menthol-containing model lotions
 ▲: Men [14 subjects], ▲: Women [13 subjects]

4. Women rate cooling sensations high due to care (self-declared) for sensitive skin.

Why do women feel cooling sensations more strongly than men? This is not just a matter of differences in the nature of the skin, or subjects with high sensitivity to cooling sensations. Similar tests have been conducted on the general consumers. First, we developed a survey questionnaire on the state of skin of general consumers, that included 100 men and 100 women. Based on the results, 53% of men and 64% of women responded with self-declared a sensitive skin as shown in Fig. 3.

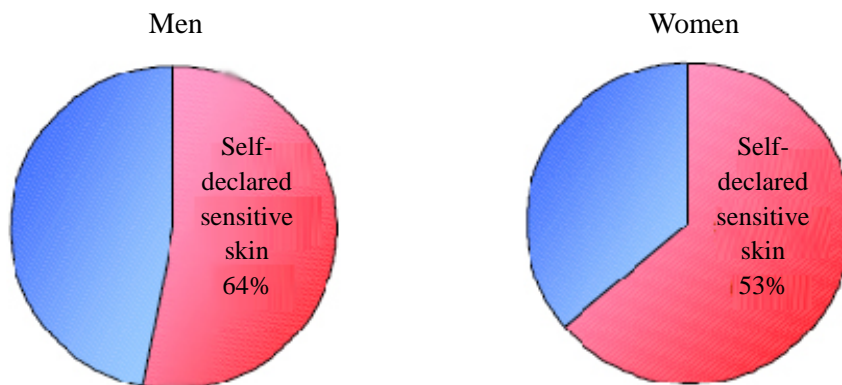


Fig. 3 Percentage of subjects responding with self-professed sensitive skin

Next, we review the percentage of individuals that felt that the cooling sensation was uncomfortably strong when actually using 0.1, 0.3 and 0.5% ℓ -menthol-containing model lotions in their arms. They were divided in to two groups: subjects that self-declared as having sensitive skin subjects, and those with for non-sensitive skin (Fig. 4). A high percentage of both, men and women experienced an unpleasant sensation with high levels of ℓ -menthol content, while a higher percentage of women than men said that the cooling sensation was “uncomfortably strong”. Moreover, as we elaborate, it is clear that women with sensitive skin were more likely to feel an unpleasant sensation from the freshening ingredients. In particular, over 15% of women that self-declared as sensitive skin felt that the cooling sensation was uncomfortably strong with 0.3% and 0.5%-content in the model lotions.

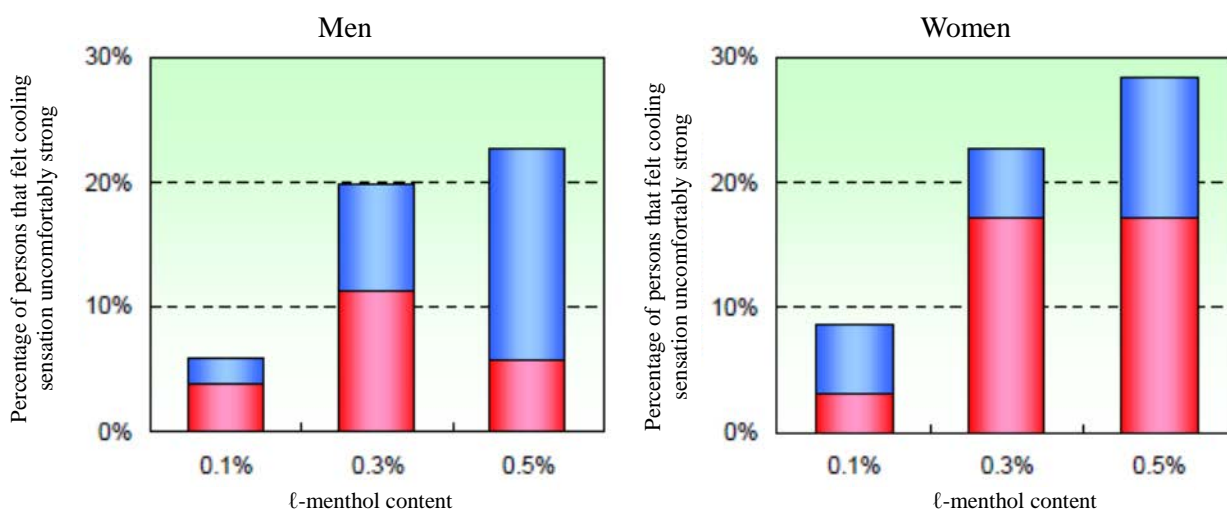


Fig. 4 Percentage of persons that felt cooling sensation was uncomfortably strong when using ℓ -menthol-containing model lotions in the arm

■: self-declared sensitive skin subject, ■: self-declared non-sensitive skin subject

Based on the results, we confirmed that the skin irritation sensitivity and actual perception was higher in women with self-declared sensitive skin. This was consistent with the evaluation results using model lotion. This indicates that the level of cooling sensation experienced differs between men and women.

5. Identification of cooling sensation comfort zone based on gender and state of skin.

Taken together the results of evaluating general consumers and the results of evaluating subjects with high sensitivity to cooling sensation, we considered how the range of comfort and perceived cooling sensation differed depending on the state of skin, and defined the following “comfort zones.” First, the percentage of women with self-declared sensitive skin that experienced discomfort with 0.1% *l*-menthol-containing model lotion was 5% or less, but 15% or more subjects felt discomfort with 0.3% *l*-menthol content. Based on this, we rated the cooling sensation score from 1 to 3 as a sensitive skin “comfort zone.” The percentage of women subjects with non-sensitive skin that experienced discomfort with 0.5% *l*-menthol-containing model lotion was 10% or less, so we defined a cooling sensation score from 1 to 4 as the non-sensitive skin “comfort zone” (Fig. 5). These results suggest that women with a strong cooling sensation, and were generally considered unfavorable in the past may tolerate relatively strong cooling sensation. The range of cooling sensation that is comfortable depends on the state of skin, and the strength of cooling sensation produced by products also may vary.

Based on the research and our findings, we believe it is possible to develop products that are comfortable to women with sensitive skin.

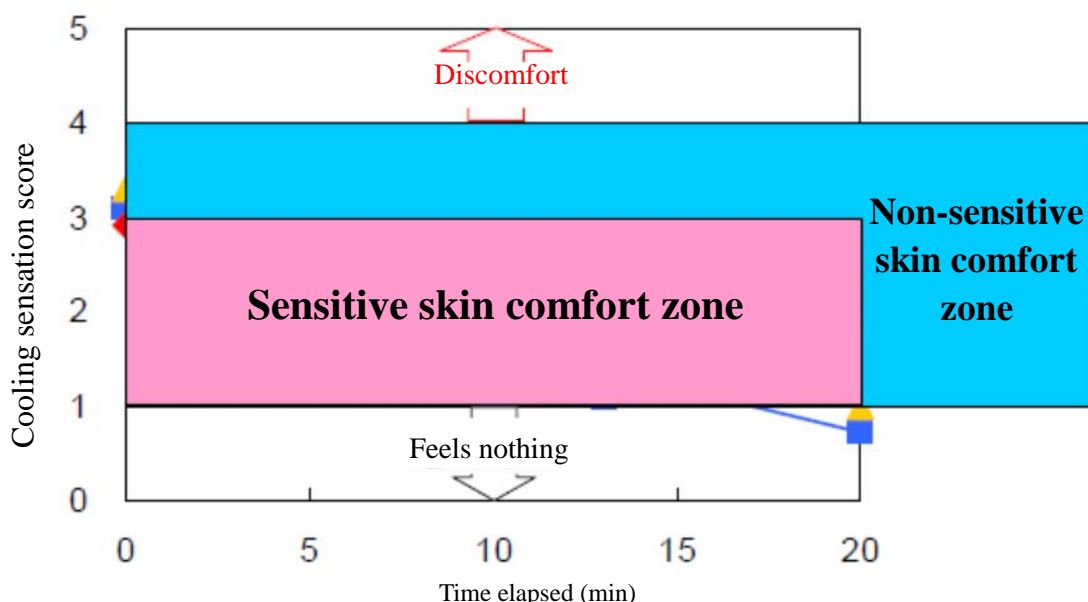


Fig. 5 Results of evaluating cooling sensation in women and comfort zones

■: *l*-mentho 0.1%, ▲: 0.3%, ◆: 0.5%

At Mandom, we intend to pursue this research, and develop products with no unpleasant sensations, either in the form of pain or burning irrespective of skin type, and ensure a comfortably cool experience.

END