

Sensory Irritation During Use of Hair Color Product and Explanation of Skin Characteristics that Increase Susceptibility to Sensory Irritation: An Evaluation Method Established by Mandom.

Mandom Corporation (Head Office: Osaka, President Executive Officer: Motonobu Nishimura, hereafter “Mandom”) has independently established a technique for appropriately evaluating sensory irritation that is experienced when using hair color (oxidative hair dye).

Additionally, we have identified and explained the skin characteristics that make one susceptible to the sensory irritation that occurs as a result of using hair color (oxidative hair dye). We expect that this will enable us to ensure that our customers can use our products more comfortably than ever before.

We plan on presenting our research achievements at the International Federation of Societies of Cosmetic Chemists (IFSCC) Osaka Conference that is held on October 16-19.

<Research Background: In Order to Ensure Comfortable Use of Hair Color>

Over the last ten years, hair color’s (oxidative hair dye) place in the world of fashion as the substance of choice for changing one’s hair color has been solidified. However, there are a few rare cases in which individuals choose to stop using hair color because of an uncomfortable tingling, prickly, or pain-like sensation that is experienced when hair color products come into contact with their skin. From our understanding, this unpleasant tingling is not an allergic reaction to dyes present in the product; instead, it is caused by alkali and hydrogen peroxide.

In order to enable consumers to comfortably use cosmetic products, a great deal of research has been conducted on sensitive skin—skin prone to experiencing this sensory irritation. Further, in order to enable consumers to understand criteria by which they can choose a product most suited to their skin and hair needs before use, we list all the compounds that are used in our cosmetic products on their labels. However, because hair color is a product for hair, not skin, almost no research has been done on its dermatological effects. Thus, in order to ensure that as many people as possible are able to use hair color products comfortably, Mandom has developed and explained—through research—a method to evaluate the sensory irritation that is experienced when using hair color products, as well as a list of characteristics of the skin types that are most likely to experience this sensory irritation.

<Evaluation Methods for the Sensory Irritation>

Common methods for evaluating sensory irritation include patch tests, in which the product is tested against their inner arm, and use tests, in which one actually uses the hair color product to dye their hair. However, because evaluation of sensory irritation varies wildly with patch tests and because use tests cannot be performed many times across a large group of people (their hair color will change), the most appropriate evaluation method has yet to be found. As a result, it has been incredibly difficult to prevent against the rare occurrence of this sensory irritation. Thus, in order to develop a method suited to multiple experiments, we carried out an experiment with a total of twenty men and women as our subjects. We found that evaluating the hair color product on the back of the neck enabled subjects to most appropriately evaluate their experience of the sensory

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irritation (refer to Table 1, Figure 1). We believe that the reason for these results is that the distribution of nerves in the scalp and neck is quite similar.

Figure 1: Appearance of a Sensory Irritation Test



Table 1: Survey of Sensitivity to Hair Color (on Multiple Parts of the Body)

Part	Decided that a higher amount of the irritating compound (containing more alkali) hurt more	Decided that a lower amount of the irritating compound (containing less alkali) hurt more	Could not differentiate
Back of the Head	76%	6%	18%
Back of the Neck	80%	20%	0%
Inner Arm	17%	34%	49%
Outer Arm	38%	25%	37%

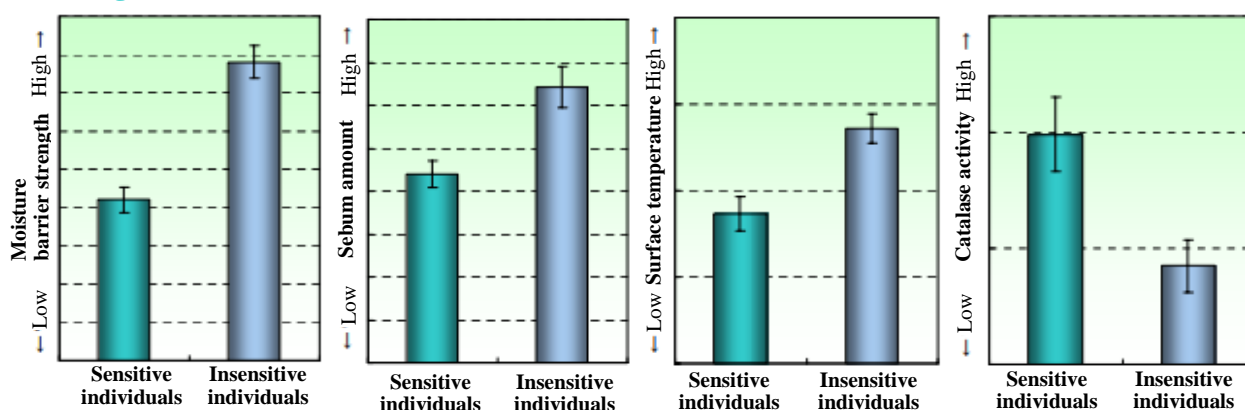
<Characteristics of Skin Prone to Experiencing Sensory Irritation>

While conducting experiments on the sensitivity of the back of the neck to sensory irritation, we also measured the skin characteristics of forty-six male subjects to determine the characteristics exhibited by individuals that were most sensitive to sensory irritation. This evaluation was conducted over the course of two experiments in June and October 2005. As a result, we discovered that subjects with the following characteristics were particularly susceptible to sensory irritation: ① low skin moisture barrier strength, ② low sebaceous secretion (easily dried, flaky skin), ③ low skin surface temperature, and ④ high skin catalase (enzyme that breaks down hydrogen peroxide, an ingredient in hair color) activity (refer to Figure 2).

By identifying the characteristics of sensitive skin using this method, we are able to provide appropriate and applicable advice to enable consumers to use hair color comfortably, such as the following: “To avoid drying out your scalp and hair, try to wash it as gently as possible the day before,” and “Do not color hair when your scalp is damaged, such as when it has been sunburned.”

Hereafter, we plan to research the relationship between skin surface temperature and enzymatic activity to continue developing comfortable products and useful advice for our consumers.

Figure 2: Skin Characteristics of Individuals Prone to Experiencing Sensory Irritation when Using Hair Color Products



Moisture barrier strength: reciprocal of transepidermal water loss; Sebum amount: Amount of sebum secreted in 20 sminutes; Surface temperature: skin surface temperature; Catalase activity: catalase activity on exfoliated skin measured via colorimetric test

<Future Applications to Hair Color Products>

Based on the results of this research, Mandom will test all of its currently marketed products using the aforementioned sensory irritation tests and will continue to only market products that meet certain comfort standards. Unlike the outcome of our older evaluation methods, the number of claims of pain and discomfort we have received from customers have gone down significantly, confirming the results of our research. In the future, we plan to continue releasing hair color products that consumers can safely and comfortably use.

Finally, we would like to indicate that we expect our current research to lessen only the sensory irritation associated with the use of hair color products, not allergic reactions to hair color products. In order to prevent allergic reactions, the Japan Hair Color Industry Association advises “individuals who have experienced rashes due to hair dyes” and “individuals who have felt sick after using hair dyes” to avoid using hair color products. We publicize these guidelines on our hair color products and have not changed our belief that individuals that are susceptible to allergic reactions avoid using hair color products.

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