〈原著〉

可視光と化粧品（第Ⅳ報）
化粧品用液体脂塗布標本における透明度増強，明度低下ならびに黒視化間の関係

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Visible Light and Cosmetics (IV): Interactions among Increased Transparency, Lightness Reduction and Temporary Optical Darkening (TOD) on Test Systems by Application of Liquid Oils.

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Abstract

It was reported previously that many creams and lotions increased the transparency of stratum corneum[1] and that a cream and oils temporarily reduced lightness on human skin without melanogenesis[2, 3]. It was considered that the application of these materials would merely induce a temporary optical darkening (TOD) which made the complexion appear darker. In this report, the causes of TOD due to the application of liquid oils on the model systems and the human skin, were investigated by means of a reflectance meter and visual observations.

1. Interaction between increased transparency and lightness reduction of model systems.

Values of lightness were measured on the lower layers (LL) and the model systems (Lb) which consisted of an upper layer and four kinds of lower layers. Lb was formed to be proportional to LL and the constant "a" of regression equation ($y = ax + b$) was an indicator of the transparency of the upper layer (Fig. 1).

When mineral oil was applied on the model systems in which the stratum corneum of human was used as an upper layer, the increased transparency of the upper layer (Fig. 2) and the lightness reduction on the systems (Table 1) were simultaneously induced in the same systems. Accordingly, it is obvious that the increase in transparency of the upper layer (stratum corneum) brings about the lightness reduction on the systems.

2. Comparison of TOD with lightness reduction on human skin.

Values of lightness on human skin were measured before (Lb) and after (La) the application of liquid oils. The means of lightness reduction ($d = Lb - La$) in the TOD-positive group due to the application of the oils were significantly greater than those in the TOD-negative group (Table 2): similar results were obtained on the frequencies of degrees of d-values (Fig. 3). From these results, it become clear that TOD was related to the lightness reduction on skin by the application of liquid oils.

3. Conclusion.

The formation of TOD is based on the following mechanisms: (1) the application of creams and liquid oils increases the transparency of stratum corneum, (2) the increased transparency reduces the lightness of the skin and (3) the visually distinguishable reduction is often recognized as TOD.

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Key Words

1. Skin and model systems
2. Increased transparency
3. Lightness reduction
4. Temporary optical darkening (TOD)
5. Liquid oils