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〈原　著〉

可視光と化粧品（第Ⅴ報）クリームおよび液体脂塗布による皮膚明度低下に関する個体差要因の検討

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Visible Light and Cosmetics (V): Causes of Individual Differences on the Reduced Skin Lightness by the Application of Creams and Liquid Oils

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Abstract

It was previously reported that applications of creams and liquid oils on the skin brought about a lightness reduction and a temporary optical darkening (TOD) due to the increased transparency of stratum corneum[1~4]. However, there were the individual differences in the degrees of the lightness reduction or the TOD. Accordingly, the causes of such differences were investigated by measuring the lightness of the model and skin systems before (Lb) and after (La) the application of the test materials to study the following relationships.

1. The relationship of the lightness reduction (d = Lb - La) with the lightness of the systems.
   1) Hyperpigmented and normal sites of the human skin.
   The d-values on the sites with higher Lb-values (above 53) were greater than those on the sites with lower Lb-values (under 53) (Fig. 1).
   2) Model systems composed of the tracing papers (upper layers) and the color plates (lower layers).
   Fig. 4 shows that d-values obtained with cream K are linearly proportional to the differences of the lightness ($\triangle L = LU - LL$) between the upper (LU) and lower layers (LL) of the systems.
2. The relationship of the d-values with the distribution of pigments.
   1) Rabbit skin injected intracutaneously with India ink.
   By the application of squalane, the lightness of the skin injected with the ink reduced more markedly than the sites injected with water (Fig. 5).
   2) Melanin-keratin disks.
   The double layer disks, having different melanin contents between the upper and the lower layers, were prepared. Fig. 6 shows that the d-values obtained with mineral oil were proportional to the reciprocal of the percentages of melanin contents in the disks.
   3) Lightness reduction and the distribution of melanin granules in a patient with chloasma.
   On a hyperpigmented site showing the lightness reduction with squalane (Table 2), the numbers of melanin granules were obviously more abundant in a basal layer than in outer layers of

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epidermis (Photo 1).

These results demonstrate clearly that the individual differences of succeptibility to the lightness reduction of skin through applications of creams and liquid oils were caused by the differences of pigment contents between the inner and outer layers in epidermis.

Key Words

1. Lightness reduction
2. Temporary optical darkening (TOD)
3. Individual difference
4. Distribution of pigments
5. Liquid oils