

〈原著〉

外用剤添加物としての感光素研究

濱田俊昭*, 加藤健治*, 石井泉*, 大隅和寿*, 早川律子**

About the Photosensitizing Dyes as a Cosmetic Ingredient

Toshiaki HAMADA,* Kenji KATO,* Izumi ISHII,*
Kazuhiisa OHSUMI,* and Ritsuko HAYAKAWA**

Abstract

We performed safety evaluations of photosensitizing dyes No 101, 201, 301 and 401 which were listed in the Japanese Standard of Cosmetic Ingredients. Primary irritant, cumulative irritant, allergic, phototoxic and photoallergic reactions were tested in animals.

Safety evaluation of photosensitizing dyes to human skin was done by patch tests in patients with skin diseases.

About the effectiveness of the photosensitizing dyes, antibacterial activity and sterilizing power were measured.

The inhibition of bactericidal activity of No 101 under the condition with Sodium Lauryl Sulfate was examined.

The cytotoxicity of No 101 on JTC-17 was compared before and after exposure to UV light.

From the results of these investigations and the previous reports, we summarized the functions and properties of photosensitizing dyes as follows:

- 1) The photosensitizing dyes were relatively free from skin hazards.
- 2) The antibacterial and sterilizing activity of No 201 was the strongest, No 101 was the second, but No 301 and 401 had no activities.
- 3) No 101 and 201 had very strong bactericidal activities to gram-positives, but showed species-specific activities to gram-negatives. Therefore it would not be useful to add only the photosensitizing dyes to cosmetic products as preservatives. However, the combined use of the dyes and parabens could possibly reduce the total amount of preservatives required in the products.
- 4) No 101 and 201 were useful to keep the skin clean.
- 5) The bactericidal activity of cationic No 101 was strongly inhibited when combined with anionic agents such as Sodium Lauryl Sulfate.
- 6) No 201 was found to have the strongest toxicity to JTC-17 and No 101 was the second, but neither No 301 nor 401 had toxicity.
- 7) No changes were found in the activity of No 101 to JTC-17 before and after UV irradiation.
- 8) It should be kept in mind not to make formulas using photosensitizing dyes in nonpolar vehicles, because their solubilities are very poor.

Key words: Photosensitizing dye, safety evaluation, antibacterial activity, bactericidal activity.