

化粧品・医薬部外品中の乳アレルギータンパク質の分析

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The determination of major allergens from cow's milk in cosmetics and quasi-drugs for skin care

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Abstract

The onset and exacerbation of food allergies in children has recently been increasing. To investigate the correlation between the development of milk allergies and epicutaneous sensitization with milk allergens, we determined the amount of milk allergens in cosmetics and quasi-drugs used for skin care. The amount of α_{S1} -casein and β -lactoglobulin was determined in 29 products using immunochromatography and enzyme-linked immunosorbent assay.

In 9 of the 29 products, the levels of α_{S1} -casein and β -lactoglobulin were quantified in the range of 7.1–18,810 $\mu\text{g/g}$ and more than the limit of detection (LOD) to 10,429 $\mu\text{g/g}$, respectively. Both α_{S1} -casein (7.1–18,810 $\mu\text{g/g}$) and β -lactoglobulin (4.4–10,429 $\mu\text{g/g}$) were detected in 5 products that displayed unfractionated milk ingredients such as yogurt or dried nonfat milk on the labels. On the other hand, β -lactoglobulin was detected in only 2 of 15 products (6.6 $\mu\text{g/g}$ and 6.9 $\mu\text{g/g}$) that displayed whey fraction on the label. In addition, the amount of α_{S1} -casein was less than LOD in 23 products that displayed whey, casein, or nonprotein fraction on the labels. According to these results, the levels of α_{S1} -casein and β -lactoglobulin tend to be influenced by the forms of milk ingredients.

Thus, these analyses revealed that 31% of randomly selected products contained detectable levels of α_{S1} -casein and β -lactoglobulin. Moreover, 4 of the 9 allergen-positive products, including soap, lotion, and bath powder, were recommended for infant use. Our study provides the first data regarding cosmetics containing allergens and the development of food allergy. These results suggest that the continuous use of cosmetics containing milk allergens may induce epicutaneous sensitization with milk allergens.

Keywords : 乳アレルギータンパク質、 α_{S1} -casein、 β -lactoglobulin、免疫クロマトグラフィー、ELISA
milk allergens, α_{S1} -casein, β -lactoglobulin, immunochromatography, ELISA

I 緒言

食物アレルギーは、「食物によって引き起こされる抗原特異的な免疫学的機序を介して、生体にとって不利益な症状が惹起される現象」と定義され¹⁾、乳児から成人まで幅広い年齢層に発症の可能性がある。特に有病率の高い年代は乳児から幼児早期にかけてであり、その三大原因食品原材料

として、卵、乳、小麦があげられる。乳幼児期に発症した食物アレルギーは、消化器機能の発達と免疫機構の成熟に伴い、抗原(アレルギータンパク質)に対する耐性を獲得し、症状が軽快していくことが一般的である。しかし、その一方でアレルギーの発症を発端として、年齢に応じて異なる症状、異なる抗原で発症する様々なアレルギーに発展する「アレルギーマーチ: allergy march」²⁾に進行するリスクがある。そ