

Bis-diglycerylpolyacyladipate-2: An emergent allergen in cosmetics?

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Since 2006, the use of bis-diglycerylpolyacyladipate-2, an ingredient in cosmetics, has been increasing. We report here the first case of contact dermatitis with this molecule.

Case Report

A 35-year-old woman presented with cheilitis and eczema on her cheeks. She had been applying a lipstick for 1 week before the beginning of the dermatitis, and was still using it at the time of consultation. She had an atopic background, as she reported allergic rhinitis and conjunctivitis, and her children both suffered from allergic asthma. She also had a poorly symptomatic hereditary haemochromatosis, treated by successive blood subtractions.

Patch testing with the European baseline series (Trolab, Almirall-Hermal, Reinbek, Germany) and her personal cosmetics was performed with IQ Chambers®. Readings were taken at days 2 and 3, according to the International Contact Dermatitis Research Group criteria. These first patch tests showed no sensitization. The patient then performed a repeated open application test (ROAT) on the forearm with her lipstick, and she developed an eczematous reaction on the site of application at day 7. L'Oréal® provided the ingredients of the product and, this time, patch tests gave positive results for the lipstick (Figure 2) and one of its ingredients: bis-diglycerylpolyacyladipate-2 (16% pet.), $\pm$ at day 2 and ++ at day 3 (Figure 1). Ten controls were negative for this ingredient.

Furthermore, the patient experienced a second eczematous reaction on her eyelids 3 days after the use of an eye shadow, also containing bis-diglycerylpolyacyladipate-2. She performed a further ROAT with the eye shadow, which gave a positive result on day 3.

Discussion

Bis-diglycerylpolyacyladipate-2 (CAS 82249-33-0) is a widely used ingredient in cosmetics in Japan and the United States. Recently, it has also started to be used in Europe. It can be considered to be a lanolin substitute. This ingredient is designed as a diglyceryl adipate mixed fatty ester in the Japanese Cosmetic Ingredients Codex. Its safety has been assessed by the Cosmetic Ingredient Review Expert Panel and the Food and Drug Administration (1, 2). When registered at the Federal German Agency for Industrial Safety, it was tested as a 'non-sensitizer' in 1990, following the Organization for

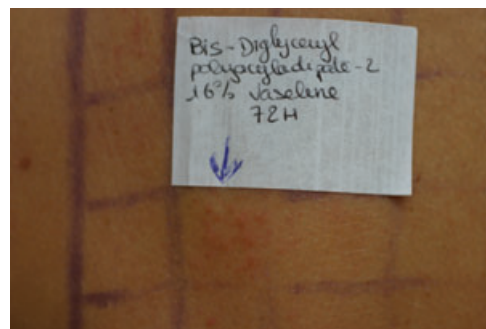


Fig. 1. Positive patch test reaction with bis-diglycerylpolyacyladipate-2 at day 3.

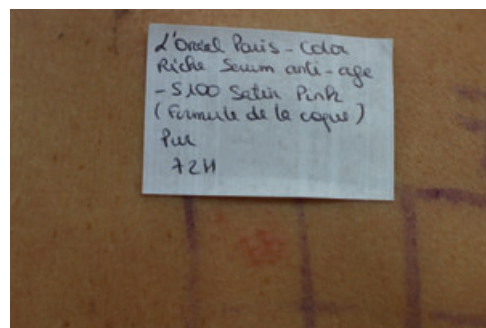


Fig. 2. Positive patch test reaction for the lipstick at day 3.

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Economic Co-operation and Development principles of Good Laboratory Practice. Bis-diglycerylpolyacyladipate-2 was also proposed as a substitute for petrolatum for patch-testing in an article in 1986, but, to our knowledge, it has not been used since then for this purpose (3).

No cross-reactions have been reported so far, although adipic acid – once reported as a contact allergen in a polyester-exposed machine repairman (4) – can be used as an intermediate in the synthesis of sebacate (4). Several cases of sensitization to the latter have been reported, mainly in antimycotic ointments and, more recently, in certain cosmetics, including lipsticks and hand creams (5–9).

The patient's lipstick had two different components: an anti-aging serum heart, and a coloured envelope, both containing bis-diglycerylpolyacyladipate-2. It was also present in her powdered eye shadow (Bourjois®).

Indeed, bis-diglycerylpolyacyladipate-2 can be found in more than 500 cosmetic products. Such wide use will probably lead to more numerous cases of contact dermatitis from now on. This observation reinforces the main message in cosmetic allergy, which is to test the personal product with patch tests and eventually the ROAT, and the provided ingredients whenever possible.

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