

New cosmetic allergens: isononyl isononanoate and trioleyl phosphate

Contact Dermatitis 2008; 59: 320–321

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Key words: allergic contact dermatitis;
anti-cellulite; cheilitis; cosmetics; cream;
emollient; isononyl isononanoate; lipstick;
skin-conditioning agent; trioleyl phosphate.

Case Report

A 40-year-old non-atopic woman, with a history of a reaction to an 'anti-cellulite' cream [Roc Retinol Body Contouring Triple Action Crème® (Johnson & Johnson, Issy-les-Moulineaux, France)], presented to one of us (K. V.) in 2002 with a contact cheilitis following the application of Rouge Novalip® lipstick (La Roche, Posay, France). Patch testing with the European baseline series (Trolab®; Hermal, Reinbek, Germany) and a cosmetics series was negative, but positive reactions were observed to Rouge Novalip (two different colours) and to the Roc Retinol Body Contouring Triple Action Crème. The ingredients were not tested at that time.

In September 2007, the patient presented again with a severe contact dermatitis on the eyelids due to a new lipstick Rouge Novalip from La Roche-Posay, which she had

applied to the eyelids, assuming it to be an eyeshadow! Patch testing was now performed with the ingredients of Rouge Novalip provided by the company, which resulted in positive reactions to isononyl isononanoate, trioleyl phosphate, and oleyl erucate.

Additional patch testing with the ingredients were performed in November 2007, using van der Bend patch test chambers (van der Bend, Brielle, the Netherlands) applied on the back with Micropore™ (3M Health Care, Borken, Germany), and secured with Mefix® (Mölnlycke Health Care, Göteborg, Sweden) as the adhesive tapes. The patch test readings were performed according to International Contact Dermatitis Research Group criteria and read on D2 and D4, and also later. This showed strong (vesicular) positive reactions to all tested ethanolic dilutions of isononyl isononanoate, tested on the forearm (Fig. 1), i.e. from 20%, being the actual use concentration in the product, down to 1%; at D7, the patient developed severe oedema of the whole test site area. The 5% preparation in pet. remained negative. There was also a positive reaction to trioleyl phosphate 1% and 0.5% in pet. The earlier positive test to oleyl erucate (20% in pet.) could not be reproduced.

As a number of chemical analogues are used in cosmetics, the patient agreed to be further tested in June 2008 (using the same materials and methods as mentioned above) in order to look for possible cross-reactions (Table 1), but no further positive reactions were observed. Testing with isononyl isononanoate (5% eth.) and trioleyl phosphate (1% in pet.) in 20 control subjects was negative. The patient has remained symptom free since avoiding contact with cosmetics containing the allergens.

Discussion

Isononyl isononanoate (CAS 59219-71-5) is the ester of a branched chain nonyl alcohol with a branched chain nonanoic acid, used as an emollient and skin conditioning agent in, e.g., lipsticks, foundations, skin care products, body and hand preparations, and make-up bases (1). In our cosmetic database (2), we have also found it to be present in sunscreens, self-tanning and cleansing products, deodorants, face powders, as well as in creams to treat pregnancy marks.



Fig. 1. Strongly positive reactions observed with a dilution series of isononyl isononanoate in ethanol (10, 5, 2.5, and 1% from left to right).

Trioleyl phosphate (CAS no. 3305-68-8) is the triester of phosphoric acid and oleyl alcohol, used as a plasticizer, skin conditioning, and occlusive agent in, for instance, lipsticks and lip gloss creams.

Rouge Novalip lipsticks contain both ingredients to which the patient reacted, while the 'anti-cellulite' cream only contains isononyl isononanoate.

We could not find any reports in the literature regarding allergic contact reactions to these agents. However, in 2003, Le Coz published a case of allergic contact dermatitis from the chemically related longer carbon chain derivative cetearyl isononanoate (with a positive reaction to its dilution 4% in liquid mineral oil), due to its presence in an emollient (3). In our patient, eth-

anol was a better vehicle for diluting isononyl isononanoate because the 5% pet. dilution remained negative.

Acknowledgement

We are grateful to the French companies L'Oréal, Pierre Fabre, and Johnson & Johnson for providing us with the ingredients of the Roche-Posay® lipstick and the chemical analogues to the allergens found, respectively.

References

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Table 1. Patch test results with isononyl isononanoate, trioleyl phosphate, and chemical analogues

Component	%	Vehicle	D2	D4	D7
Isononyl isononanoate	20	eth.	++	++	++
Isononyl isononanoate	10	eth.	NR	NR	++
Isononyl isononanoate	5	eth.	NR	NR	++
Isononyl isononanoate	2.5	eth.	NR	NR	++
Isononyl isononanoate	1	eth.	NR	NR	++
Isononyl isononanoate	5	pet.	—	?	—
Trioleyl phosphate	1	pet.	—	+	+
Trioleyl phosphate	0.5	pet.	—	+	+
Cetearyl ethylhexanoate	10, 5, 2.5, 1	eth.	—	—	—
Cetearyl isononanoate	10, 5, 2.5, 1	pet.	—	—	—
Cetyl phosphate	10, 5, 2.5, 1	pet.	—	—	—
Diisopropyl adipate	20	eth.	—	—	—
Isodecyl neopentanoate	10, 5, 2.5, 1	eth.	—	—	—
Octyldodecyl neopentanoate	10, 5, 2.5, 1	eth.	—	—	—
Oleyl erucate	20	pet.	—	—	—
Stearyl ethylhexanoate + cetyl ethylhexanoate	5	pet.	—	—	—

eth., ethanol.