

Contact dermatitis caused by polyacrylamide/C13-4 isoparaffin/laureth-7 mix in an emollient cream for atopic skin

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CASE REPORT

A 33-year-old female with a history of atopic dermatitis and seasonal rhinoconjunctivitis was referred for the investigation of eczema. The atopic dermatitis had been active since infancy, ceased during her teenage years, but relapsed when she was aged 25 years, mainly on the hands. She reported a recent flare-up of inflammatory skin lesions on her chest, arms and face after applying a moisturizing cream to attenuate atopic skin-related dryness on these areas.

After this episode, patch tests were performed on the upper back, with IQ Ultra patch test chambers (Chemotechnique Diagnostics, Vellinge, Sweden) occluded for 2 days with Oper tape (Iberhospitex; Innovative Health Technologies, Barcelona, Spain); the European baseline series was tested along with a cosmetic series (Chemotechnique Diagnostics) and the suspected cream "as is." Tests were read on day (D) 2 and D4 according to ICDRG criteria. All patch tests gave negative results except for the emollient cream (+ on D2; ++ on D4) (Supporting Information Figure S1). In a second step, all ingredients of this cream, kindly provided by the manufacturer, were tested either individually or as a mix of

different ingredients. The patch test with polyacrylamide/C13-4 isoparaffin/laureth-7 mix "as is" was the only one to give positive reactions (+ on D2; ++ on D4) (Figure 1). We patch tested five control patients, and all had negative results with this ingredient mixture. The corresponding individual ingredients could not be obtained from the manufacturer; however, laureth-7 was later tested separately, but only in a citrated form (BTC Chemical Distribution, Monheim, Germany) 1%, 5% and 10% aq. and pet. A patch test with polidocanol 3% pet., which corresponds to laureth-9 (AllergEAZE, Smart Practice, Calgary, Canada), was also carried out to search for a cross-reaction. All latter tests gave negative results on D2 and D4. We advised the patient to avoid this mixture.

DISCUSSION

Polyacrylamide/C13-4 isoparaffin/laureth-7 mix (INCI name) or SEPIGEL 305 (trade name) is a non-ionic, pre-neutralized polymer included in an inverse emulsion. Used in cosmetics, it acts as a thickening, stabilizing and texture agent. According to regulation No. 1272/2008 (EC), this mixture is classified as an irritant for the eyes and skin, but is not known to elicit allergic skin reactions. C13-14 isoparaffin is used as an emollient and solvent, and polyacrylamide is used as an antistatic, binding and film-forming agent in cosmetics. Laureth-7 is a synthetic compound used as an emulsifier and surfactant in the formulation of a variety of bath, eye, facial, hair, cleansing and sunscreen products, as well as in cuticle softeners, deodorants, and moisturizing products. Laureth ingredients are obtained by reacting ethylene oxide with lauryl alcohol, and the number associated with the laureth—in this case, 7—refers to the average number of repeating ethylene oxide units in the molecule.

Allergic contact dermatitis caused by laureths is uncommonly reported. Several cases of contact dermatitis caused by laureth-9 (polidocanol) in shampoos or other cosmetics have been previously published.^{1,2} Polidocanol is also used for vein sclerosis, and systemic allergic reactions have been reported in this context.³ One case related to laureth-4 contained in an acne treatment cream has been reported,⁴ as has another one related to laureth-12 in a hair dye.⁵ Cross-reactivity has not been mentioned so far. Lower-numbered laureths are more water-soluble, and higher-numbered laureths are more lipophilic, and optimal patch test vehicles (and concentrations) have, in fact, not been determined for these substances.

Allergic contact dermatitis caused by paraffin and to polyacrylamide has not yet been reported. Only occupational contact allergy to the

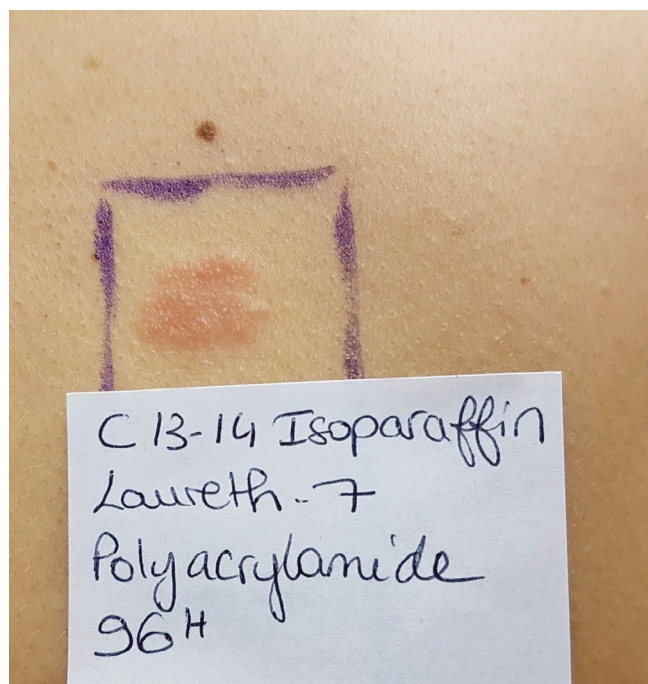


FIGURE 1 Positive patch test reaction to polyacrylamide/C13-4 isoparaffin/laureth-7 mix: 2+ on day 4

monomer acrylamide used in the preparation of materials for polyacrylamide gel electrophoresis has been previously documented, in two cases.^{6,7} Because the different ingredients of the mixture could not be tested separately, it is unknown whether the allergic skin reaction experienced by our patient was caused by a compound allergy, or by an impurity present in the mixture or one of its components, or by individual sensitization to laurth-7 or to polyacrylamide. To our knowledge, this observation is the first case reported of contact dermatitis related to polyacrylamide/C13-4 isoparaffin/laurth-7 mix in a cosmetic cream.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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