

Photo-allergic contact dermatitis caused by isoamyl *p*-methoxycinnamate in an 'organic' sunscreen

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Case Report

A 39-year-old female presented with a 20-year history of a polymorphic, urticated and papular eruption occurring on sun-exposed sites but sparing the face and hands. She had been referred because, after many years of sunscreen use, she had begun to develop an exacerbation of her rash at sites of application of a new sunscreen, including, for the first time, the face. She described an urticated eruption at the site of application of this sunscreen that would settle after several days with scaling. This was an 'organic' sunscreen purchased online, and claimed to be natural and "made without parabens, lanolin, phthalates, artificial perfumes, petrochemicals and colorants to bring you the purest sunscreen that nature can offer".

A diagnosis of polymorphic light eruption with a super-added allergic contact dermatitis was made. She was patch tested according to the International Contact Dermatitis Research Group guidelines, and photopatch tested according to the British Photodermatology Group guidelines: a commercial sunscreen series (Chemotechnique Diagnostics, Vellinge, Sweden) was applied in duplicate. The patches were removed at D2, and one set only was irradiated with 5 J/cm² of ultraviolet (UV)A light (N-Line Pro; Saalman, Herford, Germany) (1). The irradiated area was read along with all patches at D4.

We observed a ± reaction to *Myroxylon pereirae* on D4. In the photopatch test sites, there was a ++ reaction to 4-methylbenzylidene camphor [CAS 36861-47-9], which is an organic camphor derivative used in the cosmetic industry for its UV protection ability. This occurred at both irradiated and non-irradiated sites, in keeping with an allergic

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contact dermatitis. There was no reaction to isoamyl *p*-methoxycinnamate (CAS 71617-10-2) on the control site, but there was a + reaction on day 4 at the irradiated site, in keeping with a photo-allergic contact dermatitis (PACD).

Among the long list of ingredients in the patient's sunscreen was isoamyl *p*-methoxycinnamate ('a UV-filter derived from cinnamon acid esters', according to the manufacturers). Since changing to a sunscreen without the above allergens, she has not developed any further problems.

Discussion

Isoamyl *p*-methoxycinnamate is an effective water-proof UVB filter that rarely causes PACD. In one of the

largest retrospective studies, of 2715 patients undergoing photopatch testing over 15 years, only 2 two cases of PACD caused by isoamyl *p*-methoxycinnamate were reported (2), and only 1 case was reported in a smaller study from Rotterdam (3). The risk of developing PACD may be higher in patients with photodermatoses such as polymorphic light eruption and chronic actinic dermatitis. Isoamyl *p*-methoxycinnamate has been reported to cause an urticated rather than dermatitic contact reaction (4). Isoamyl *p*-methoxycinnamate can cross-react with flavourings and fragrances, such as *Myroxylon pereirae* – as in this case – and coca leaves, cinnamic acid, and cinnamal (5). Cinnamal has a 'histamine-releasing' effect, resulting in non-immunological contact urticaria, suggesting a mechanism for the clinical presentation of PACD in this case.

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