

undoubtedly one of the major players with a sizable presence in the market. Several cases of allergic contact dermatitis caused by tea tree oil have been reported.¹ De Groot² published the first case of systemic allergic contact dermatitis to this allergen. Years later the same author also reported an airborne case.³ Non-eczematous contact patterns such as erythema multiforme-like⁴ presentations have also been described.

Growing evidence in this field corroborates the increasing dermatological concern about the widespread use of products with ingredients of relevant sensitizing power such as tea tree oil.⁵ As a consequence, it is tempting to suggest that such substance could even be considered for inclusion in the paediatric baseline series, especially for studying cases with airborne pattern.⁶

Tea tree oil can be found as an ingredient in various cosmetic products, or as a main ingredient in 'pure' oils. It's supposed benefits are not restricted to one concrete pathology, so it has been used indistinctively for conditions such as acne, onychomycosis, or as in our case, for the treatment of molluscum contagiosum. The true incidence of adverse reactions to these 'natural' products may be underestimated as many of them are probably not reported.

In summary, we present a new case of systemic allergic contact dermatitis caused by tea tree oil. Once again, performing a rigorous anamnesis is crucial to detect other sources of contact with culprit allergens.

ACKNOWLEDGEMENTS

We would like to acknowledge all staff working in the Contact Eczema and Immunoallergic Diseases Department, especially the specialized nurse Victor Alfredo Cassini Gómez de Cádiz.

CONFLICT OF INTEREST

None to declare.

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How to cite this article: Navarro-Triviño FJ, Prados-Carmona Á, Ruiz-Villaverde R. Systemic allergic contact dermatitis caused by tea tree oil in a cream for treatment of molluscum contagiosum. *Contact Dermatitis*. 2022;87(3):285-287. doi:[10.1111/cod.14138](https://doi.org/10.1111/cod.14138)

Relevant sensitization to diethylamino hydroxybenzoyl hexyl benzoate and fragrances in a patient with frontal fibrosing alopecia and acquired dermal macular hyperpigmentation

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KEY WORDS: acquired dermal macular hyperpigmentation, CAS no. 302776-68-7, case report, cinnamal, cinnamyl alcohol, diethylamino hydroxybenzoyl hexyl benzoate, frontal fibrosing alopecia, lichen planus pigmentosus, pigmented contact dermatitis, sunscreens

We report a patient with pruritic hyperpigmentation of the face and neck, who subsequently developed frontal fibrosing alopecia (FFA), and who was shown to be sensitized to fragrances and to the ultraviolet (UV)-filter diethylamino hydroxybenzoyl hexyl benzoate.

CASE REPORT

A nonatopic Brazilian female (Fitzpatrick skin phototype V) developed, at the age of 49, pruritic and progressive macular hyperpigmentation of the face and neck without clinically apparent eczematous lesions (Figure 1). She had related her symptoms to a particular sunscreen, which she had thrown out. As the pigmentation kept spreading, she increased the use of sunscreens, yet often switched brands because of intolerance to most of them. She also avoided perfumes because she recalled having “reactions” from them. A skin biopsy showed abundant dermal melanophages without inflammation.

By the age of 51, she had started to notice hair loss of her eyebrows and, 2 years later, signs of frontal hairline regression compatible with FFA.

Patch tests were performed with the GEIDAC baseline series and supplementary allergens, personal cosmetic products, as well as an extended photo-patch test series (5 J/cm² UVA). Allergens were from Chemotechnique Diagnostics (Vellinge, Sweden), applied on Finn Chambers AQUA (SmartPractice, Phoenix, Arizona), occluded for 2 days

(D) and read on day (D)2, D4 and D7 (Table S1). We observed multiple reactions, among others, to diethylamino hydroxybenzoyl hexyl benzoate 10% pet. (++) on D2, + on D4/D7) without photo-aggravation, cinnamal 1% pet. (+++ on D2, D4 and D7) and cinnamyl alcohol 2% pet. (+++ on D2, D4 and D7). Diethylamino hydroxybenzoyl hexyl benzoate was found in one of her sunscreens, and cinnamal and cinnamyl alcohol in a facial moisturizer. We also observed reactions to propolis and gallates, which, although of unclear relevance, have been observed in other patients with FFA.^{1–3} The pruritus improved and further spreading of hyperpigmentation ceased upon avoidance measures.

DISCUSSION

Diethylamino hydroxybenzoyl hexyl benzoate (Uvinul A plus, CAS no. 302776-68-7)⁴ is a synthetic benzophenone derivative, and one of the 27 UV filters authorized (max. 10% w/w) in sunscreens and cosmetics in the EU; it mainly provides UVA protection.⁵ No previous cases of skin sensitization to this filter have been reported.

Our patient presented with pruritic skin pigmentation involving her forehead, cheeks and neck, without eczema, of which the onset was related to the use of sunscreens; moreover, positive patch tests were obtained to ingredients contained in her sunscreens and cosmetics. She was thus diagnosed with non-eczematous (lichenoid) pigmented contact dermatitis (PCD), which, together with lichen



FIGURE 1 (A,B) Macular confluent brown-grey pigmentation of the forehead, temples, cheeks and lateral sides of the neck and thorax. The pigmentation was associated with clear-cut signs of frontal fibrosing alopecia (FFA) presenting with hairline recession at the frontal and temporal areas as well as hair loss of the eyebrows. (C) Positive reaction to diethylamino hydroxybenzoyl hexyl benzoate 10% pet. (++) on D2). (D) Strong reactions to cinnamal 1% pet. (+++ on D2) and cinnamyl alcohol 2% pet. (+++ on D2)

planus pigmentosus (LPP), falls within the spectrum of acquired dermal macular hyperpigmentation, an umbrella term that encompasses clinically overlapping disorders histologically characterized by an interface dermatitis with pigment incontinence.⁶ Our patient demonstrated, besides PCD, also features of LPP, that is, the symmetrical distribution with involvement of the neck flexures.

We previously published another patient, sensitized to *Magnolia officinalis* bark extract, who initially presented with facial and flexural hyperpigmentation reminiscent of LPP, and, subsequently, developed FFA and eczematous lesions.³ Other patients who first developed LPP, and thereafter FFA, have been reported.⁷ Contact sensitization to hair dyes has also been described in patients with acquired dermal macular hyperpigmentation,⁸ and recently a case of lichenoid contact dermatitis with hyperpigmentation and scarring alopecia was reported⁹; in our patient paraphenylenediamine and semi-open tests with hair dyes remained negative.

The positive reactions to diethylamino hydroxybenzoyl hexyl benzoate and to cinnamal and cinnamic alcohol are likely due to concomitant sensitization as all three were present in products used by the patient. Co-sensitizations to cinnamal and cinnamyl alcohol have recently been described in patients' photo-allergic to ketoprofen,¹⁰ the latter also being a benzophenone derivative, similar to benzophenone-3 (oxybenzone) and diethylamino hydroxybenzoyl hexyl benzoate (Figure S1). Although this might indicate potential cross-reactivity between these filters, and relate to associated co-sensitizations to these particular fragrances, our patient was not shown to be photo-allergic to ketoprofen nor to benzophenone-3.

It still remains debated whether sensitization to cosmetic ingredients might trigger and/or aggravate lichenoid skin inflammation, FFA in particular.

CONFLICT OF INTEREST

The authors declare that they do not have any conflicts of interests regarding this case report.

ETHICS STATEMENT

Authors obtained informed written consent from our patient for the attached photographs to be published.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

How to cite this article: Gatica-Ortega ME, Vergara-de-la-Campa L, Alonso-Naranjo L, Pastor-Nieto MA. Relevant sensitization to diethylamino hydroxybenzoyl hexyl benzoate and fragrances in a patient with frontal fibrosing alopecia and acquired dermal macular hyperpigmentation. *Contact Dermatitis*. 2022;87(3):287-289. doi:10.1111/cod.14139