



Allergic contact dermatitis to decyl glucoside: Still an important allergen in Tinosorb M

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Since its first description in 2006, the organic UV filter Tinosorb M is in the focus due to sensitization by its surfactant decyl glucoside.^{1,2} Tinosorb M is a widely used UV filter complex that contains the active component bisoctrizole (CAS no. 103597-45-1; or methylene bis-benzotriazolyl tetramethylbutylphenol), propylene glycol, xanthan gum, water, and the surfactant decyl glucoside, an alkyl glucoside.¹⁻³

CASE REPORT

Case 1

A 48-year-old non-atopic female office secretary presented with a 6-month history of pruritic eczema on the face, predominantly affecting the eyelids, after the application of different cosmetic products (Figure 1A). Patch testing with IQ Ultra chambers was performed with the Portuguese Contact Dermatitis Study Group baseline series, cosmetic, fragrance series I and II, and a photoallergen series (Chemotechnique Diagnostics, Vellinge, Sweden) together with her cosmetic products.

On day (D) 3 there was a positive reaction to lanolin alcohol, fragrance mix I and II (citral, citronellol, geraniol), Amerchol L101, decyl glucoside, lauryl glucoside, Tinosorb M (containing decyl glucoside), and Sensiphase AR A-Derma cream (Figure 1B-D and Table 1). Positive reactions (+) to Tinosorb M were identified in both irradiated (D3/D7; 5 J/cm² UVA) and non-irradiated test series (D3/D7) with the same intensity. A repeated open application test with Sensiphase AR A-Derma cream, which contains Tinosorb M, was performed two times daily on the right flexor aspect of the forearm near the cubital fossa, with a positive response on D5. This facial cream was considered the culprit product as the remaining ones did not contain any fragrances nor the emulsifiers identified in the patch testing.

Case 2

A 44-year-old non-atopic female presented with a 2-year history of pruritic erythema with papules on the face and neck with transient improvements (Figure S1A). She mentioned that acute episodes tended to appear after outdoor work as an archaeologist.

The patient was patch tested with the Portuguese Contact Dermatitis Study Group baseline series, and a cosmetic and photoallergen series (Chemotechnique Diagnostics) together with her cosmetic products. Readings on D3 showed a positive reaction to methylchloroisothiazolinone/methylisothiazolinone, *Myroxylon pereirae* resin, benzoic acid, decyl glucoside, lauryl glucoside, Tinosorb M (containing decyl glucoside), Photoderm Max Bioderma, and Avène crème Teintee sunscreen (Table 1 and Figure S1A-C). Positive reactions (+) to Tinosorb M were identified in both irradiated (D3/D7; 5 J/cm² UVA) and non-irradiated test series (D3/D7) with the same intensity. The final results were consistent with allergic contact dermatitis to both sunscreens containing Tinosorb M, and the patient was retrospectively able to relate flares to work periods during which sun protection had been intensified. Methylchloroisothiazolinone/methylisothiazolinone was considered also most likely relevant as this preservative was present in the patient's shampoo.

DISCUSSION

In 2017 the American Contact Dermatitis Society named alkyl glucosides "Allergen of the Year."³ Alkyl glucosides are non-ionic surfactants and cleansing agents formed through the condensation of glucose with a fatty alcohol.³ Their use in cosmetic products has increased as they are biodegradable and considered less irritant and less allergenic than anionic surfactants.³ They are found in rinse-off products (cleaning agents, shampoos, and hair dyes) and occasionally in leave-on cosmetics (sunscreens, fragrances, and deodorants).^{3,4}



FIGURE 1 (A) Erythematous and pruriginous plaque on the upper and lower eyelid in patient 1. (B) Positive reaction to lanoline, fragrance mix I and II, Sensiphase AR A-Derma. Herbalife cleaning gel was considered an irritant. (C) Positive reaction to amerchol, decyl glucoside, and lauryl glucoside. (D) Positive reaction (+) to Tinosorb M, geraniol, citral, and citronellol

Our first case highlights the importance of searching for the hidden allergen in the components of facial cream, as nowadays the majority of facial creams contain UV filters. As demonstrated by our two cases, either concomitant or cross-reactivity to several alkyl glucosides in the same patient is frequent.^{4,5} This may be explained by the difficulty in achieving high purity of these chemicals and/or by their chemical similarity.⁵ For the patient it is important to know cross-reactivities, given the great number of cosmetics with alkyl glucosides. Furthermore, it should be noted that in both patients other

important sensitizations were identified, emphasizing the importance of polysensitization.^{1,2,5}

Most authors believe that alkyl glucosides are an underreported cause of allergic contact dermatitis in cosmetics as demonstrated by the high number of patients found in the European multicenter photopatch test study.⁶ Moreover, previous sensitization to alkyl glucosides through cosmetics may favor further reactivity to decyl glucoside in Tinosorb M.^{2,5} Taking into account the diversity of products containing alkyl glucosides, patient guidance might become a challenging issue.

TABLE 1 Summary of positive patch test reactions

	Allergen	Concentration	D3/ D7
Case 1	Lanolin alcohol	30% pet.	++
	Amerchol L101	50% pet.	++
	Fragrance mix I	8% pet.	++
	Fragrance mix II	14% pet.	+
	Citral	2% pet.	+
	Citronellol	1% pet.	+
	Geraniol	1% pet.	+
	Tinosorb M	10% pet.	+
	Decyl glucoside	5% pet.	++
	Lauryl glucoside	3% pet.	++
Case 2	Sensiphase AR A-Derma	"as is"	++
	Methylchloroisothiazolinone/ methylisothiazolinone	0.02% aq.	++
	Myroxylon pereirae (balsam of Peru)	25% pet.	+
	Benzoic acid	25% pet.	+
	Tinosorb M	10% pet.	+
	Decyl glucoside	5% pet.	+
	Lauryl glucoside	3% pet.	+
	Photoderm Max Bioderma	"as is"	++
	Avène crème Teintee	"as is"	++

CONFLICTS OF INTEREST

No conflicts of interest to declare.

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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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