

- CONTRIBUTIONS TO THIS SECTION WILL NOT UNDERGO PEER REVIEW, BUT WILL BE REVIEWED BY THE EDITOR •

Octyldodecyl xyloside: a novel contact allergen

Mark Wilkinson and Rachel Ann Powis

Department of Dermatology, The General Infirmary Leeds, Leeds LS1 3EX, UK

doi:10.1111/j.1600-0536.2011.01951.x

Key words: alkyl polyglycoside; contact urticaria; cosmetics; octyldodecyl xyloside; patch test.

We describe a case of contact dermatitis caused by octyldodecyl xyloside, an alkyl polyglycoside (APG) present in a cosmetic skin serum.

Case History

A 50-year-old woman developed an extensive urticated rash following the use of a cosmetic skin serum applied to her limbs and trunk. The reaction developed within 2 hr of application, and persisted for 48 hr after removal. Its distribution corresponded with the areas of application. The patient had previously experienced similar reactions after using certain brands of soap and laundry detergent.

Patch testing with a baseline, photo-patch, facial and fragrance series together with her own products was carried out. There was a positive reaction to the serum (as is) read at D2 (+) and D4 (+), which was reproducible on repeat testing. Tests in twenty controls gave negative results.

Patch testing with individual constituents of the serum produced a reaction to octyldodecyl xyloside 6% in petrolatum (pet.) (–/+). Tests in 20 controls gave negative results. The supplied octyldodecyl xyloside was noted to be a mixture containing octyldodecanol 60%, octyldodecyl xyloside 20%, and polyethylene glycol (PEG)-30 dipolyhydroxystearate 20%.

Octyldodecyl xyloside was only available as part of a blend with octyldodecanol; therefore, further patch testing involved testing a dilution series of pure octyldodecanol 0.5%, 1%, 5% and 10% in pet., a dilution series of pure PEG-30 dipolyhydroxystearate 1.5%, 3%, 15% and 30% in pet., and a dilution series of octyldodecyl

xyloside 0.5%, 1%, 5% and 10% and octyldodecanol 25% mixture in pet. There was no reaction to pure octyldodecanol or to PEG-30 dipolyhydroxystearate. Positive reactions were noted to the octyldodecyl xyloside and octyldodecanol mixture at 40% (+/+), 20% (+/+) and 4% (–/+) in pet. Tests in 20 controls to the 40% concentration gave negative results.

By exclusion, it was concluded that octyldodecyl xyloside was the causative contact allergen.

Discussion

Octyldodecyl xyloside is present in a number of currently available cosmetic products (1). Structurally, it belongs to the glycoside group, a family of small organic molecules in which a sugar component (glycone) is bound to a non-carbohydrate component (aglycone) by a glycosidic bond.

This large group of compounds was initially identified in the early 1800s, and can be classified by the subtype of the glycosidic bond (C, N, S or C-linkage) or by the chemical nature of the aglycone (e.g. alcohol) (2).

Octyldodecyl xyloside is, more specifically, one of the APGs, a group of glycosides that act as non-ionic surfactants by virtue of combining a sugar glycone and a fatty alcohol aglycone (3).

As far as we are aware, octyldodecyl xyloside has not previously been identified as a contact allergen in the literature. A recent animal study using the local lymph node assay (LLNA), a method of assessing the skin-sensitizing capabilities of a chemical, reported that octyldodecyl xyloside (referred to as C18 branched glucoside) invoked a response. However, the response was not dose-related, and it was felt that this might reflect an irritant reaction similar to that seen with other surfactants in the LLNA (1). Another report concluded that there was no evidence of reactions indicative of skin sensitization to octyldodecyl xyloside in animal studies (4).

Despite the lack of concrete evidence in animal studies to implicate octyldodecyl xyloside as a skin sensitizer, this case demonstrates that the chemical

Correspondence: Dr Mark Wilkinson, Department of Dermatology, The General Infirmary Leeds, Great George Street, Leeds LS1 3EX, UK. Tel: +44 113 243 2799; Fax +44 113 392 3565. E-mail: mark.wilkinson@leedsth.nhs.uk

Conflicts of interest: The authors have declared no conflicts.

Table 1. Chemical properties of alkyl polyglycosides (4, 6–8)

INCI name ^a	Case number ^a	Technical name(s)	Glycone	Aglycone	Structure	Function
Octyldodecyl xyloside	423772-95-6	D-Xylopyranoside, 2-Octyldodecyl	Xylose	Octyldodecanol	C ₂₅ H ₅₀ O ₅	Emulsifying agent
Lauryl glucoside	110615-47-9	Dodecyl D-glucoside D-Glucopyranoside, Dodecyl Lauryl D-glucopyranoside	Glucose	Lauryl alcohol	C ₁₈ H ₃₆ O ₆	Surfactant –cleansing agent
Decyl glucoside	54549-25-6	Decyl-β-D-Glucopyranoside β-D-Glucopyranoside Glucoside, Decyl D-Glucoside, Decyl	Glucose	Decyl alcohol	C ₁₆ H ₃₂ O ₆	Surfactant –cleansing agent
Palm kernel/coco glucoside	^b	^b	Glucose	Coconut alcohol	^b	Surfactant –cleansing agent
Cetearyl glucoside	246159-33-1	^b	Glucose	Cetearyl alcohol	^b	^b

INCI, International Nomenclature for Cosmetic Ingredients.

^aChemical Abstracts Service Registry Number.^bUnavailable.**Table 2.** Details of reported allergic contact reactions to alkyl polyglycosides (9–14)

Case number	References	Product causing reaction	Contact allergen in product	Cross-reactions
1	4	NA	Decylglucoside	NA
2	5	Shampoo, sunscreen	Decylglucoside	Methylglucose diolate ^a
3	5	Shampoo	Decylglucoside	Not tested
4	5	Shampoo	Laurylglucoside	Cocoglucoside
5	5	Shampoo	Decylglucoside/laurylglucoside	Cocoglucoside, cetearylglucoside
6	6	Antiseptic gel	Decylglucoside	Not tested
7	7	Hair mousse	Decylglucoside	Not tested
8	8	Sunscreen	Decylglucoside	Cocoglucoside
9	9	Shampoo/shower gel	Cocoglucoside/laurylglucoside	Not tested
10	9	Sunscreen/body lotion	Cocoglucoside/laurylglucoside	Cetearyl glucoside ^b

NA, article unavailable in English.

^aPatient declined further testing with this compound, but was suspected of being allergic.^bCompound unavailable.

invoked a clinically significant contact reaction that was consistently reproduced on patch testing, indicative of an allergic reaction.

There is evidence that other APGs behave as contact allergens. Such compounds are present in large numbers of cosmetic products, such as shampoos, lotions, and tanning products (5). Table 1 summarizes the main

characteristics of the culprit APGs from 10 case reports of contact allergy, and Table 2 summarizes the findings, including examples of cross-reactions between glucosides. From the results of these combined studies, it would appear that there may be a group effect, with cross-reactions between the glucosides tested, although further studies are needed.

References

- Garcia C, Ball N, Cagen S et al. Comparative testing for the identification of skin-sensitizing potentials of non-ionic sugar lipid surfactants. *Regul Toxicol Pharmacol* 2006; **58**: 301–307.
- 'Glycoside' from Wikipedia, the free encyclopedia. Available at: <http://en.wikipedia.org/wiki/Glycoside> (last accessed 10 April 2011).
- Global B2B Exchange. RUSBIZ.com. (Product information). Available at: <http://e-catalog.rusbiz.com/product/39737.html> (last accessed 10 April 2011).
- National Industrial Chemicals Notification and Assessment Scheme (NICNAS) of Australia. Full public report. D-Xylopyranoside, 2-octyldodecyl (INCI Name: Octyldodecyl xyloside), 2010. Available at: <http://www.nicnas.gov.au/publications/CAR/new/Std/StdFULLR/std1000FR/std1362FR.pdf> (last accessed 25 November 2010).
- Pascoe D, Moreau L, Sasseville D. Emergent and unusual contact allergens in cosmetics. *Dermatitis* 2010; **21**: 127–137.
- Personal Care Council. Online INFOBASE Ingredient database. Available at: <http://online.personalcarecouncil.org/jsp/Home.jsp> (last accessed 10 April 2011).
- 'Decyl glucoside' from Wikipedia, the free encyclopedia. Available at: http://en.wikipedia.org/wiki/Decyl_glucoside (last accessed 10 April 2011).
- 'Lauryl glucoside' from Wikipedia, the free encyclopedia. Available at: http://en.wikipedia.org/wiki/Lauryl_glucoside (last accessed 10 April 2011).
- Giordano-Labadie F, Marguery M C, Viraben R. Décylglucoside: un nouvel allergène cosmétique. *Rev Fr Allergol Immunol Clin* 2005; **45**: 74–82. Cited in: Pascoe D, Moreau L, Sasseville D. Emergent and unusual contact allergens in cosmetics. *Dermatitis* 2010; **21**: 127–137.
- Blondeel A. Contact allergy to the mild surfactant decyl glucoside. *Contact Dermatitis* 2003; **49**: 304–305.
- Le Coz C J, Meyer M T. Contact allergy to decyl glucoside in antiseptic after body piercing. *Contact Dermatitis* 2003; **48**: 279–280.
- Horn H M, Murray C, Aldridge R D. Contact allergy to decyl glucoside. *Contact Dermatitis* 2005; **52**: 227.
- Anderson K E, Goossens A. Decyl glucoside contact allergy from a sunscreen product. *Contact Dermatitis* 2006; **54**: 345–350.
- Goossens A, Decraene T, Platteaux N et al. Glucosides as unexpected allergens in cosmetics. *Contact Dermatitis* 2003; **48**: 164–166.