



to pentylene glycol 5% in water/alcohol (equal parts) solution. (+ at D2, D3, and D4).

DISCUSSION

Pentylene glycol (1,2-dihydroxypentane; CAS no. 5343-92-0) is a solvent, humectant, and preservative often used in cosmetics as an alternative to propylene glycol because, although it has similar structure and properties, it is considered to be associated with a lower risk of allergic and irritant skin reactions.¹ Cross-reactivity between the 2 substances is possible,² but our patient did not react to propylene glycol present in the cosmetic series.

Reports of contact allergy to pentylene glycol are rare.¹⁻⁶ To our knowledge, this preservative is not commercially available as a patch test allergen, and sensitization to it is likely to pass undetected unless specifically looked for. The severity of the clinical picture in our patient suggests that its allergenic potential may be stronger than hitherto suspected, particularly when it is contained in cosmetics meant for delicate areas such as the eyelids. Its inclusion in the list of substances under investigation as potential add-on allergens in cosmetic series might be warranted.

CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

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Contact dermatitis due to 2,2,4-trimethyl 1,3-pentanediol diisobutyrate contained in latex-free, accelerator-free nitrile rubber gloves

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KEYWORDS: 2,2,4-trimethyl 1,3-pentanediol diisobutyrate (TXIB), accelerator-free nitrile gloves, allergic contact dermatitis, case report, latex-free

Accelerators are the most common cause of allergic contact dermatitis due to rubber gloves. Today, a variety of accelerator-free gloves, as well as specific-purpose gloves containing antimicrobial agents or

moisturisers, are available,¹ which are an effective replacement for patients with allergies to accelerators. However, we report a rare case where these types of glove caused an allergic reaction.



FIGURE 1 Diffuse erythema and papules on dorsa of hands

CASE REPORT

A 49-year-old woman working at a Japanese traditional patisserie presented at our clinic with refractory hand eczema. Because she was using rubber and vinyl gloves for a prolonged time, we suspected that she had occupational contact dermatitis. Patch testing was performed with Japanese baseline allergens 2008 (Brial Allergen, Greven, Germany and Torii Pharmaceutical, Tokyo, Japan) on the gloves used and other skin products using Finn Chambers (SmartPractice, Phoenix, Arizona) on Scanpor tape (Norgesplaster, Vennessla, Norway). Test strips were removed from the back after 2 days (D) and readings were performed at D2, D3, and D7 according to guidelines of the International Contact Dermatitis Research Group (ICDRG). The test was positive (+) for thiuram mix, (++) for neomycin, (+) for nitrile rubber gloves, and (+) for polyvinyl chloride gloves. Therefore, we advised the use of latex-free and accelerator-free nitrile rubber gloves (glove A), and although we saw improvement, this proved to be temporary. We again conducted a

patch test where a positive reaction (+) for glove A was observed. However, we could not ignore the possibility that this was an irritant response, thus the patient continued to use glove A. When she showed no sign of improvement (Figure 1), we conducted a third patch test using glove A and 6 other nitrile gloves that were both latex-free and accelerator-free. She showed positive for glove A and another glove (glove B).

From the above results, chemical analysis of glove A and glove B was conducted at the National Institute of Technology and Evaluation. Extraction was carried out by the acetone extraction method and analysis was performed using gas chromatography mass spectrometry (Figure 2). We then conducted another patch test using the chemicals extracted and 5 components of thiuram mix (Table 1). The patient was positive for the extract 2,2,4-trimethyl-1,3-pentenediol diisobutyrate (TXIB) from glove A and B 5% pet. and 3 components of the thiuram mix. A control patch test of TXIB 5% pet. on 6 people, 3 whom were healthy and 3 with hand eczema, was negative.

DISCUSSION

Accelerators are the most common cause of contact dermatitis due to rubber gloves. Hamnerius et al² have reported that the allergens responsible for allergic contact dermatitis is as common for diphenylguanidine as it is for thiurams. However, it is also true that chemicals that are not accelerators have been reported to also cause contact dermatitis.³ Regarding TXIB (Figure 3), David et al⁴ reported that the plasticizer demonstrated no evidence of sensitization or irritation.

The only previously reported allergic reaction due to TXIB was as a component in vinyl chloride gloves;⁵ there are no reported cases of contact dermatitis due to TXIB in nitrile rubber gloves. For glove allergies, it should be noted that even if in an accelerator-free glove, there are other chemicals that may cause rare, but possible, reactions.

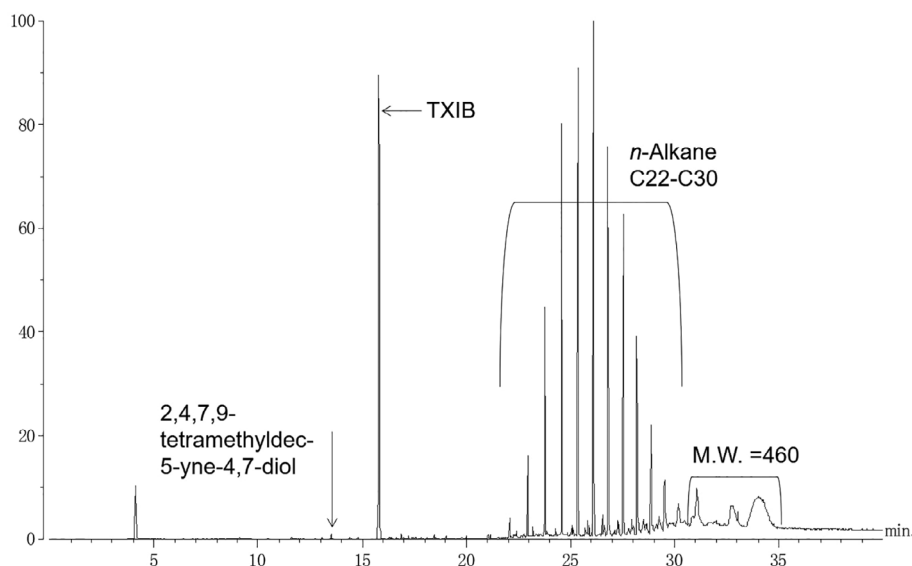


FIGURE 2 The result of gas chromatography mass spectrometry analysis of extract from glove A

TABLE 1 Patch test results

Materials	Conc./vehicle	D2	D3
Glove A	"as is"	+	+
Glove B	"as is"	+	+
Acetone extract of glove A ^a	2% pet.	+	+
Acetone extract of glove B	2% pet.	?+	+
TXIB	5% pet.	?+	+
Thiuram mix ^b	1.25% pet.	+	+
TMTD	1% pet.	+	+
TETD	1% pet.	++	+
TMTM	1% pet.	++	+
Control (pet.)	"as is"	-	-

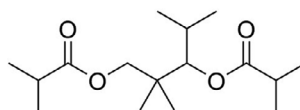
Note: +: erythema, slight infiltration; ++: erythema, infiltration, vesicles; +?: faint erythema only; -: negative reaction.

Abbreviations: Conc, concentration; TETD, tetraethylthiuram disulfide; TMTD, tetramethylthiuram disulfide; TMTM, tetramethylthiuram monodisulfide; TXIB, 2,2,4-trimethyl-1,3-pentanediol diisobutyrate.

^aThe National Institute of Technology and Evaluation prepared the mixed materials of dry extracts with pet. TXIB: a reagent of 97.0% purity from Tokyo Chemical Industry.

^bThiuram mix is one of the allergens in the Japanese baseline series 2008, Brial allergen.

FIGURE 3 2,2,4-trimethyl-1,3-pentanediol diisobutyrate (TXIB). Cas No. 6846-50-0



2,2,4-Trimethyl-1,3-pentanediol Diisobutyrate (TXIB)

CAS No. 6846-50-0 可塑剂

C16H30O4 Mol. Wt.: 286.41 Exact Mass: 286.21

CONFLICT OF INTERESTS

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