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Allergic contact dermatitis caused by octylisothiazolinone in a leather car seat: Case report and emergence of octylisothiazolinones in leather goods in Switzerland

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KEYWORDS: allergic contact dermatitis, CAS no. 26530-20-1, leather, methylisothiazolinone, octylisothiazolinone, preservative

CASE REPORT

A 69 years non-atopic man presented with a 6 months history of pruriginous lesions started on his back with subsequent extension to his arms. At clinical examination, erythematous plaques were present on his back, shoulder and arms (Figure 1A).

The biopsy showed parakeratosis with intraepidermal oedema and spongiosis with lymphocyte exocytosis in epidermis consistent with eczematous dermatitis.

Topical corticosteroids allowed improvement but the lesions relapsed whenever they were stopped. The only change in his environment was his new car with leather seats.

Patch tests were performed with the European baseline series, a preservative, a textile series, a piece of his sofa's leather and a piece of his car seat's leather 'as is'. Patch test materials were supplied by Chemo-technique Diagnostics. At the readings on Day (D) 2 and D 4, the patch tests showed positive results for octylisothiazolinone (OIT) 0.1% pet. (++) and the leather car seat samples (++) (Figure 1B). They were negative for methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) 0.01% aq., MI 0.2% aq. and benzisothiazolinone (BIT) 0.1% pet.

The patient has used two cream products for the treatment of his leather seats (Creams A and B). Both products lacked information about their composition. These two products as well as a small piece

of car seat leather were sent for chemical analysis to the Official Food and Veterinary Control Authority of Geneva.

An amount 0.5 g of crushed leather was stirred in 5 ml of methanol (MeOH) and sonicated for 15 min. After 10 min of centrifugation (3500 RCF), the sample was analysed by high-pressure liquid chromatography coupled to a diode array detector from Agilent Technologies. Separation was achieved using a Poroshell 120 EC-C18 column (100 × 4.6 mm i.d.; 2.7 µm) from Agilent technologies maintained at 40°C with a gradient mobile phase consisting of 5 mM ammonium formate (pH 4.2) (Solvent A) and MeOH (Solvent B). The gradient started with 8% B for 1 min and then was linearly increased in serial plates: first to 25% B in 1 min, then to 30% B in 5 min, to 50% B in 4 min and to 70% B in 10.5 min. It was then further increased up to 100% B in 5.5 min and held for 2 min at the final composition. Gradient was then decreased to the starting composition in 0.1 min and equilibrated for 5 min before next injection.

Thiazolinone compounds were detected at 274 nm for MI and MCI, 280 nm for OIT and 318 nm for BIT. Two cream products (A and B) were also analysed in the same way. Results are reported in Table 1.

OIT was identified and quantified at very high concentration (305 mg/kg) in the leather car seat and was not found in the protective creams suggesting that OIT was originally present in the leather.

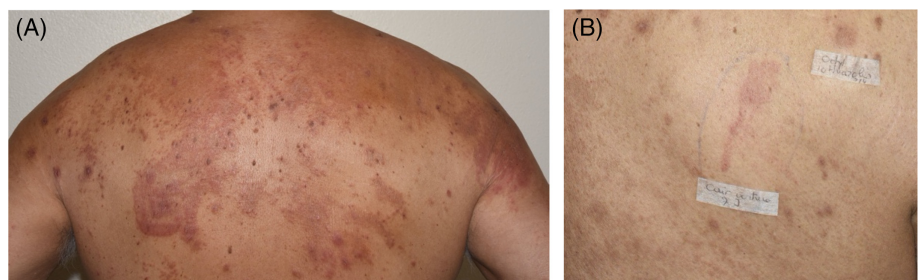


FIGURE 1 (A) Well-demarcated eczematous lesions on the upper back, shoulders and arms. (B) Patch tests positive for OIT (++) and leather car seat samples (++) at D4

	MI (mg/kg)	MCI (mg/kg)	BIT (mg/kg)	OIT (mg/kg)
Car seat leather	ND	ND	ND	305
Cream A	19.3	ND	29.4	ND
Cream B	ND	ND	ND	ND

TABLE 1 Results of chemical analysis

Abbreviations: BIT, benzisothiazolinone; MCI, methylchloroisothiazolinone; MI, methylisothiazolinone; ND, not detected; OIT, octylisothiazolinone.

TABLE 2 Isothiazolinones concentration in leather goods

Leather goods	MI (mg/kg)	MCI (mg/kg)	BIT (mg/kg)	OIT (mg/kg)
Adult Shoes	ND	ND	ND	ND
Children's shoes	ND	ND	ND	ND
Children's shoes	ND	ND	ND	ND
Children's shoes	ND	ND	ND	ND
Children's shoes	ND	ND	ND	ND
Adult flip flops	ND	ND	ND	12.7
Gloves	ND	ND	ND	ND
Gloves	ND	ND	ND	ND
Adult clogs	ND	ND	ND	14.1
Children's slippers	ND	ND	ND	ND
Children's slippers	ND	3.9	ND	ND
Children's slippers	ND	ND	ND	ND
Children's shoes	ND	ND	11.1	19
Baby slippers	ND	ND	ND	ND
Baby slippers	ND	ND	29.9	ND
Baby slippers	ND	ND	ND	18.7
Gloves	ND	ND	ND	ND
Gloves	ND	ND	ND	ND
Shoes	ND	ND	ND	15.5
Shoes	ND	ND	ND	ND
Soles	10.3	ND	14.8	12.4
Children's slippers	ND	9	29.3	8.9
Adult clogs	ND	ND	ND	ND
Adult slippers	8.6	ND	18.5	95.6
Gloves	ND	ND	ND	11.5
Gloves	ND	ND	ND	ND
Gloves	ND	ND	ND	9.9
Gloves	ND	3	ND	23.9
Soles	ND	ND	31.5	ND
Hat	ND	3.1	9.2	157.8
Heel pads	ND	ND	ND	ND
Soles	ND	ND	ND	ND
Children's shoes	ND	ND	9	8.9
Children's shoes	ND	ND	10.1	18.7
Children's shoes	ND	ND	ND	ND
Children's shoes	ND	ND	15.8	158
Adult flip flops	ND	ND	ND	ND
Adult sandals	ND	ND	ND	ND
Children's shoes	ND	ND	10.7	54

TABLE 2 (Continued)

Leather goods	MI (mg/kg)	MCI (mg/kg)	BIT (mg/kg)	OIT (mg/kg)
Children's shoes	ND	8.4	ND	11.6
Children's shoes	ND	ND	ND	27.9
Children's shoes	ND	ND	ND	14.7
Children's shoes	ND	ND	ND	ND
Children's shoes	ND	ND	ND	33.7
Children's shoes	ND	ND	ND	ND
Children's shoes	19.2	ND	ND	8.1
Children's shoes	ND	ND	8.9	8.3
Children's shoes	20.5	ND	ND	7.4
Children's shoes	ND	ND	20.1	36.6
Children's shoes	ND	ND	9.2	17.6
Children's shoes	ND	ND	ND	ND
Children's shoes	8.5	ND	ND	ND
Sofa	ND	ND	11.3	184
Sofa	ND	ND	8	131
Sofa	ND	ND	8.8	88.9
Sofa	ND	ND	23.5	97.5
Sofa	9.9	ND	14.3	83.6
Sofa	ND	ND	8	40.7

Abbreviations: BIT, benzisothiazolinone; MCI, methylchloroisothiazolinone; MI, methylisothiazolinone; ND, not detected; OIT, octylisothiazolinone.

DISCUSSION

OIT is a preservative agent with antifungal and antibacterial properties used in different products such as paints, household detergents, cutting and cooling fluids and the leather industry. In the last few years, multiples cases of non-occupational allergic contact dermatitis to OIT in leather goods have been reported.^{1,2} Since 2018, in our clinic, this case is the second reported case of leather contact dermatitis due to OIT.³ In collaboration with the Official Food and Veterinary Control Authority of Geneva, 58 random leather goods from the Swiss market (belts, shoes for kids, sofa and etc.) were analysed and surprisingly, OIT was present in 55.1% of them (Table 2) with sometimes high concentrations up to 184 mg/kg (mean concentration: 44.7 mg/kg). Furthermore, the potential harmful effects of OIT on human health are still not well elucidated. Kim et al.⁴ showed in their in vitro study that OIT induced blood brain barrier dysfunction.

Currently, there is no European legislation regarding the maximum authorized concentration of OIT in leather goods. As their usage increases, careful monitoring of contact allergy to this preservative seems indicated.

AUTHOR CONTRIBUTIONS

Yassaman Alipour Tehrany: Conceptualization; writing – original draft; writing – review and editing. **Raphael André:** Writing – review and editing. **Aurélié Bugey:** Conceptualization; writing – review and editing; methodology; investigation. **Doriane Santimaria:** Investigation. **Patrick Edder:** Supervision. **Pierre Piletta:** Conceptualization; writing – review and editing; supervision.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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Contact urticaria to ethanol contained in a hand sanitizer

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KEYWORDS: alcohol, case report, contact urticaria, ethanol, hand sanitizer

Hand disinfection is a milestone of hand hygiene highlighted in the context of the COVID-19 pandemic. Many hand sanitizers are alcohol-based products, the antimicrobial activity of alcohols resulting from their ability to denature proteins.

We describe the case of a woman presenting contact urticaria induced by ethanol.

CASE REPORT

A 39-year-old woman with atopic background was referred to the department of allergology with a history of cutaneous eruptions

located to her hands after applying hand sanitizer. A challenge test was performed using ethanol-based hand sanitizer (Aniosgel 85 NPC, Laboratoires Anios, Lezennes, France) containing ethanol, water, thickening agents, emollients and no perfume nor colouring agents. Urticarial papules associated with intense pruritus appeared 5 min after the application of the products to the hands (Figure 1).

Open tests were performed 3 months later. Since allergens in alcohol may be ethanol itself or impurities, we tested ethanol (minimum purity 99.8%; Cooper, Melun, France), methanol (min. 99.8%; Carlo Erba reagents, Val-de-Reuil, France) and acetaldehyde (min. 99.5%; Merck KGaA, Darmstadt, Germany). We also tested isopropyl alcohol (min. 99.8%; Carlo Erba reagents, Val-de-Reuil, France)