

Allergic contact cheilitis caused by ditrimethylolpropane triethylhexanoate in a lipstick

Maiko Miura^{1,2}, Mamiko Isami¹, Akiko Yagami¹ and Kayoko Matsunaga¹

¹Department of Dermatology, Fujita Health University School of Medicine, Aichi, 470-1192, Japan and ²Department of Dermatology, Kariya Toyota General Hospital, Aichi, 448-8505, Japan

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Correspondence: Maiko Miura, Department of Dermatology, Kariya Toyota General Hospital 5-15, Sumiyoshi-cho, Kariya, Aichi, 448-8505, Japan. Tel: 0566-21-2450; Fax: 0566-22-2493. E-mail: lunato@hotmail.co.jp

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Lipsticks are composed of dyes, flavouring agents, sunscreens, vehicle components, and preservatives. Recently, several branched fatty acid esters have been used in lipsticks as pigment solvents in place of castor oil, because

the latter is a known contact allergen (1). Ditrिमethylolpropane triethylhexanoate is a new branched fatty acid ester used in lipsticks. Here, we report a case of allergic contact cheilitis caused by ditrimethylolpropane triethylhexanoate in a lipstick.

Case Report

A 38-year-old female with a history of atopic dermatitis and urticaria presented with cheilitis of several years' duration. She had been treated with topical steroids, and changed her lipstick a year ago, but her cheilitis had not improved. Patch tests were performed with the Japanese standard allergens as well as samples of her cosmetics, applied on her back with Finn Chambers® on Scanpor® tape (Epitest Ltd, Tuusula, Finland). The tests were occluded for 2 days, and read according to the International Contact Dermatitis Research Group Scoring Scale (2) on D2, D3, and D7. There was a positive reaction to her current lipstick 'as is'. The patient was subsequently patch tested according to the list of 18 ingredients in the lipstick obtained from the manufacturer. The ingredients were prepared in pet., and the patient showed a positive reaction to ditrimethylolpropane triethylhexanoate 'as is' (Table 1). Ditrिमethylolpropane triethylhexanoate accounted for 15% of the lipstick. A total of four consecutive controls were negative to ditrimethylolpropane triethylhexanoate 'as is'. From these observations, we diagnosed the patient as having allergic contact cheilitis caused by ditrimethylolpropane triethylhexanoate in the lipstick.

Table 1. Patch test results

Materials	Concentration	D2	D3	D7
Lipstick	As is	?+	+	+
Ditrिमethylolpropane triethylhexanoate	As is	—	+	+
Other ingredients of lipstick	—	—	—	—

References

- Sai S. Lipstick dermatitis caused by castor oil. *Contact Dermatitis* 1983; **1**: 75.
- Fregert S. *Manual of Contact Dermatitis*, 2nd edition: Copenhagen, Munksgaard, 1981.
- Suzuki K, Matsunaga K, Suzuki M. Allergic contact dermatitis due to isopalmityl diglyceryl sebacate in a lipstick. *Contact Dermatitis* 1999; **41**: 110.
- Sowa J, Suzuki K, Tsuruta K, Akamatsu H, Matsunaga K. Allergic contact dermatitis from propylene glycol ricinoleate in a lipstick. *Contact Dermatitis* 2003; **48**: 228–229.
- Sugaya N, Harada T, Suzuki K, Matsunaga K. Allergic contact cheilitis due to isopalmityl diglyceryl sebacate in a lipstick. *J Environ Dermatol Cutan Allergol* 2007; **1**: 43–46.
- Tanaka B, Inaba Y, Nakagawa M, Suzuki K, Matsunaga K. A case of contact cheilitis due to glyceryl isostearate. *J Environ Dermatol Cutan Allergol* 2009; **3**: 163–169.
- Fujii M. Development of DGS (isopalmityl diglyceryl sebacate) as a vehicle component of lipsticks for the purpose of protecting lips from dryness. *Fragrance J* 1994; **2**: 31–37.
- Gotou N, Ebara T. Development of pigment dispersant. *Fragrance J* 2003; **31**: 120–126.

Discussion

There are reports of allergic contact dermatitis caused by lipsticks (1, 3–6). Cases of allergic contact cheilitis caused by isopalmityl diglyceryl sebacate (3, 6), glyceryl isostearate, and diisostearyl malate (7) – chemicals used in place of castor oil in lipsticks – have been reported. Ditrिमethylolpropane triethylhexanoate was first introduced onto the market in 2003. Ditrिमethylolpropane triethylhexanoate is a new pigment solvent that has superior pigment dispersibility to conventional solvents such as diisostearyl maleate (8). It is a white or light yellow liquid oil, and is a triester consisting of ditrimethylolpropane and 2-ethylhexanoate (8) (Fig. 1). When ditrimethylolpropane triethylhexanoate is used together with wax, the mixture is hard, and this enables the lipstick to have a smoother texture because of the reduction in the volume of wax in the lipstick (8). Ditrिमethylolpropane triethylhexanoate is stable against heat, and mixes well with other oils; it may be used for various products, such as skin care products (8). Our case demonstrates that ditrimethylolpropane triethylhexanoate has sensitizing properties. This is the first case of allergic contact dermatitis caused by ditrimethylolpropane triethylhexanoate reported in the literature.

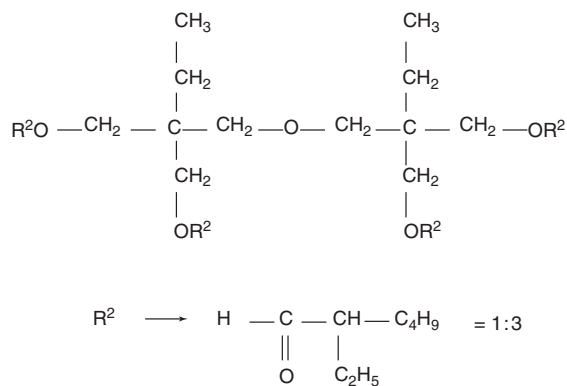


Fig. 1. Chemical structure of ditrimethylolpropane triethylhexanoate.