

Patch test with sorbitan sesquioleate in Italian consecutive patients: A 1-year multicenter SIDAPA study

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KEYWORDS: fragrance mix, patch test, SIDAPA baseline series, sorbitan sesquioleate

Sorbitan sesquioleate (SSO) is an oil-soluble and nonionic surfactant derived from sorbitol and oleic acid. It is used as water-dispersible emulsifier in several cosmetics and pharmaceutical preparations, including moisturizers, personal care products, nail treatments, toothpastes, and topical medications such as corticosteroids, antibiotics, and antifungals.^{1,2} Moreover, SSO has been added in the 1990s at a concentration of 5% to fragrance mix I (FM I) as an emulsifier for the eight constituents of FM I.^{3,4} However, as SSO is a well-known contact allergen, it could cause false-positive patch test reactions to FM I.⁵ Recently, de Groot et al raised the question of whether the addition of SSO to the European baseline series is necessary, reasonable, or unavoidable.⁶ The prevalence of positive patch test reactions to SSO and the concomitant reactions to FM I in the Italian population were thus studied.

METHODS

In 11 clinics homogeneously distributed across Italy, 5336 consecutive patients (1702 men and 3634 women; mean age 46.1 years) were

patch tested for contact dermatitis between January and December 2018. Patch testing was performed with the SIDAPA (Società Italiana di Dermatologia Allergologica Professionale e Ambientale) baseline series⁷ containing SSO 20% pet. since 2016 and FM I 8% pet. including 5% SSO. Haye's Test Chambers (Haye's Service, Alphen aan den Rijn, The Netherlands) on SOFFIX tape (Artsana, Grandate, Italy) were used with allergens from FIRMA Diagent (Florence, Italy). Readings were performed on day (D) 2, D4, and D7 according to ESCD recommendations; patients were asked to return in case of late reactions. Irritant and doubtful reactions were not considered.

RESULTS

Among the 5336 patients tested, 27 (0.5%) showed positive reactions to SSO, 12 males (0.6%) and 15 females (0.4%). In 59.3% (16/27) of these patients we observed strong (++) and extreme (+++) positive reactions, more commonly in females (66.7%) than in males (50.0%; Table S1). Clinical relevance was observed in 19 of 27 SSO-positive

TABLE 1 Concomitant and nonconcomitant reactivity between sorbitan sesquioleate 20% pet. (SSO) and fragrance mix I (FM I) in 5336 consecutively patch-tested patients

	FMI-positive patients (+/++/+++ +) (%)	FMI-negative patients (%)	Total (%)
SSO-positive patients (+/++/+++)	14 (6.2)	13 (0.3)	27 (0.5)
SSO-negative patients	212 (93.8)	5097 (99.7)	5309 (95.5)
Total	226 (100)	5110 (100)	5336 (100)

patients (70.4%), and ++ and +++ reactions were more frequent in patients with clinical relevance (68.4%) than in patients without clinical relevance (37.5%; Table S1).

All relevant positive reactions to SSO were observed in patients with non-occupational sources of exposure to this emulsifier. Particularly, relevant positive reactions to SSO were induced by cosmetics in 10 patients (52.7%; seven by leave-on and three by rinse-off cosmetics), by topical corticosteroids in four (21.0%), and by other topical medications in five (26.3%). The latter group had leg ulcers treated for many years with pharmaceutical preparations containing SSO. Involved sites of allergic contact dermatitis induced by SSO included hands in eight patients (42.1%), upper extremities in three (15.8%), face in three (15.8%), feet in two (10.5%), and lower extremities in two (10.5%); a generalized eruption was seen in two patients (10.5%). Concomitant patch test results to SSO and FM I are reported in Table 1. Among all patch-tested patients, 226 (4.2%) reacted to FM I; of these, 14 (6.2%) showed positive patch test reaction to SSO.

DISCUSSION

Data from 5336 patients consecutively patch tested in Italy during a 1-year period showed a prevalence of 0.5%, meeting the threshold of 0.5%–1.0% for inclusion in the baseline series.⁸ The prevalences reported in other European countries range from 0.2% in Denmark (4637 patients patch tested from 2010 to 2014)¹ to 2.7% in The Netherlands (in 395 children and adolescents from 1996 to 2013).⁹ Moreover, among the non-European countries, a retrospective study conducted in the United States in 591 patch-tested patients in 2008–2010 showed a higher prevalence (3.9%),⁵ probably due to a higher exposure to SSO.

Of note, ++ and +++ positive reactions to SSO were observed in most of our patients, especially in females, probably due to the source of exposure (often cosmetics). All patients with clinically relevant reactions to SSO had non-occupational sources of sensitization, and in 52.7% of these patients cosmetic products, particularly leave-on cosmetics, were responsible for SSO sensitivity, as previously reported.¹ The remaining patients (47.3%) with relevant positive reactions to SSO were sensitized through corticosteroid ointments and other topical medications, confirming previously published data.⁵ In fact, SSO is

an ingredient in many topical corticosteroids,⁴ as well as in topical dressings for leg ulcers.¹⁰

Regarding concomitant reactions to FM I, 6.2% of patients sensitized to FM I were positive to SSO (Table 1). This frequency is similar to that reported by the Information Network of Departments of Dermatology study in 1669 patients (5.5%)⁶ and higher than that reported in Denmark in 426 patients (1.4%).¹ Without patch testing SSO, these patients could be wrongly diagnosed as allergic to FM I. This supports continued testing of SSO in the baseline series for a longer period to better study its prevalence. Conversely, in patients sensitized to SSO, 51.9% also reacted to FM I. This frequency is 13 times higher than in SSO-negative patients (4.0%, 212/5309), and higher than recently reported,⁶ probably due to the lower prevalence of FM I sensitivity in our Italian patients (4.2%).

CONFLICT OF INTEREST

All authors have no interests to report.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Stingeni L, Tramontana M, Bianchi L, et al. Patch test with sorbitan sesquioleate in Italian consecutive patients: A 1-year multicenter SIDAPA study. *Contact Dermatitis*. 2019;1–3. <https://doi.org/10.1111/cod.13359>

Online supplemental Table 1 Reactions to sorbitan sesquioleate 20% pet. in 5336 consecutively patch tested patients

Positive reactions (%)				Relevant positive reactions* (%)				Non-relevant positive reactions (%)			
Scores	+	++	+++		+	++	+++		+	++	+++
N. patients	11	11	5	N. patients	7	8	4	N. patients	4	3	1
27 (0.5)	(40.7)	(40.7)	(18.6)	19 (70.4)	(36.8)	(42.1)	(21.1)	8 (29.6)	(50.0)	(37.5)	(12.5)
Females	5	8	2	Females	3	6	1	Females	2	2	1
15 (0.4)	(33.3)	(53.4)	(13.3)	10 (66.6)	(30.0)	(60.0)	(10.0)	5 (62.5)	(40.0)	(40.0)	(20.0)
Males	6	3	3	Males	4	2	3	Males	2	1	0
12 (0.6)	(50.0)	(25.0)	(25.0)	9 (75.0)	(44.5)	(22.2)	(33.3)	3 (37.5)	(66.7)	(33.3)	(0.0)

* Cosmetics "leave on": 7; cosmetics "rinse off": 3; corticosteroids: 4; other topical medications: 5