

## Hypersensitivity Reaction to Detergents – A Myth or Reality?

Dear Editor,

Contact allergic dermatitis (CAD) and urticaria are among the most common allergic diseases in dermatovenerology (1,2). In order to diagnose CAD, it is necessary to demonstrate contact sensitization through patch testing, the presence of dermatitis, and a clinically relevant exposure to a positive allergen (1). In comparison with CAD, acute urticaria most often do not require extensive diagnostic workup, unless food or drug hypersensitivity is suspected (2). Patients presenting at a hospital with eczema and/or hives often report that they have stopped using and or have experimented with numerous fabric softeners, shampoos, bath products, detergents, and foods, having been convinced that these are the triggers for their skin conditions. Although patients and even some physicians often suspect laundry detergents, studies have shown that only a very small percentage of cases is actually linked to these products. A study from 1992 found that 26% of 3 841 patients with skin changes believed that laundry detergent was the cause (3). Similarly, a 2002 study on 738 patients with a suspicion of CAD found that 10.7% believed detergent was the cause of their skin lesions (4). This opinion was shared by 2.3% of the physicians involved in the study (4). From 2012 to 2014, out of 26 062 cases linked to powder laundry detergent, 72.2% were diagnosed with CAD (5). Numerous cosmetics ingredients that can also be found in detergents are known to be possible triggers for hives (6). However, laundry products contain substances that can potentially cause skin reactions, such as surfactants, washing enhancers, bleaches, additives (fragrances, enzymes, dyes), and preservatives. A meta-analysis found that the most common allergens that tested positive in patch tests among the general population were nickel, chromium, and fragrances (1). Although less common, preservatives such as methylchlorisothiazolinone, methylisothiazolinone, and 1,2-benzisothiazolin-3-one (BIT) and fragrances

used in laundry detergents have also been reported (1,7). However, just the presence of these allergens in products is in most cases not sufficient to identify them as causes of CAD (8). Their concentration in a product, the method of application, and the residue left on clothes after washing must also be considered. A patch test on 36 individuals previously sensitized to fragrance showed that only 2 had a mildly positive reaction, and only at concentrations 20 times higher than the fragrance residue on clothing after washing (8). Similarly, BIT concentration substantial enough to cause skin changes was not detected in laundry detergent (7). When examining actual exposure to enzymes in laundry detergents, Basketter *et al.* concluded that there was no risk of skin reactions, either irritant or allergic (9). Different types of textiles were washed using a standard procedure and then remained on patients for 48 hours in the form of a patch test (including patients with seborrheic dermatitis and young children). The results showed no visible reactions in any of the individuals (10). Belisto *et al.* conducted extensive testing on over 700 patients for more than two years (4). Patch testing was performed using detergents diluted to a 0.1% concentration in water, and patients who tested positive underwent further testing to compare reactions to liquid detergents and detergent granules, followed by a third phase where half of a 100% cotton T-shirt was washed with detergent and worn by patients for 12 hours a day over 14 days, after which the results were recorded (4). They concluded that the laundry detergent could have been the cause of CAD in less than 0.7% of patients (4). Although 1.3% had a positive reaction to chromium, 10.3% to nickel, and 18.4% to fragrance, none of these patients had a positive reaction to the detergent itself. Furthermore, among the participants there were 5 patients with atopic dermatitis who, despite having hypersensitive skin, did not develop CAD (4).

Although many detergent ingredients are known to be allergens, their residual concentration on machine-washed clothes is not clinically significant, even in individuals with very sensitive skin (4,11). However, if skin changes are confined to areas covered by clothing, particularly high-friction regions such as the axilla and groin, it is advisable to perform a patch test using a 0.1% aqueous solution of the detergent (4); but even in such cases, skin changes are more likely to result from substances present in the clothing material itself rather than from residual detergent (11).

### References:

1. Alinaghi F, Bennike NH, Egeberg A, Thyssen JP, Johansen JD. Prevalence of contact allergy in the general population: A systematic review and meta-analysis. *Contact Dermatitis*. 2019;80:77-85.
2. Zuberbier T, Aberer W, Asero R, Abdul Latiff AH, Baker D, Ballmer-Weber B, *et al*. The EAACI/GA<sup>2</sup>LEN/EDF/WAO guideline for the definition, classification, diagnosis and management of urticaria. *Allergy*. 2018;73:1393-414.
3. Dallas MJ, Wilson PA, Burns LD, Miller J, Markee N, Harger B. Dermatological and Other Health Problems Attributed by Consumers to Contact with Laundry Products. *Home Economics Research Journal*. 1992;21:34-49.
4. Belsito DV, Fransway AF, Fowler JF Jr, Sherertz EF, Maibach HI, Mark JG Jr, *et al*. Allergic contact dermatitis to detergents: a multicenter study to assess prevalence. *J Am Acad Dermatol*. 2002;46:200-6.
5. Swain TA, McGwin G Jr, Griffin R. Laundry pod and non-pod detergent related emergency department visits occurring in children in the USA. *Inj Prev*. 2016;22:396-9.
6. Verhulst L, Goossens A. Cosmetic components causing contact urticaria: a review and update. *Contact Dermatitis*. 2016;75:333-44.
7. Bai H, Tam I, Yu J. Contact Allergens in Top-Selling Textile-care Products. *Dermatitis*. 2020;31:53-8.
8. Norman T, Johnson H, Yu J, Adler BL. Is Laundry Detergent a Common Cause of Allergic Contact Dermatitis? *Cutis*. 2023;111:172-5.
9. Basketter DA, English JS, Wakelin SH, White IR. Enzymes, detergents and skin: facts and fantasies. *Br J Dermatol*. 2008;158:1177-81.
10. Matthies W, Löhr A, Ippen H. Bedeutung von Rückständen von Textilwaschmitteln aus dermatotoxikologischer Sicht [Significance of laundry detergent residues from a dermato-toxicological viewpoint]. *Derm Beruf Umwelt*. 1990;38:184-9.
11. Svedman C, Engfeldt M, Malinauskiene L. Textile Contact Dermatitis: How Fabrics Can Induce Dermatitis. *Curr Treat Options Allergy*. 2019;6:103-11.

**Erin Puch<sup>1</sup>, Daška Štulhofer Buzina<sup>2,3</sup>,  
Suzana Ljubojević Hadžavdić<sup>2,3</sup>**

<sup>1</sup>*School of Medicine, University of Zagreb, Zagreb, Croatia*

<sup>2</sup>*Department of Dermatology and Venereology, University Hospital Centre Zagreb, Zagreb, Croatia*

### Corresponding author:

Suzana Ljubojević Hadžavdić, MD, PhD  
University Hospital Center Zagreb  
School of Medicine University of Zagreb  
Kišpatićeva 12, Zagreb, Croatia  
[suzana.ljubojevic@gmail.com](mailto:suzana.ljubojevic@gmail.com)