

Allergy to hypoallergenic nail polish: does this exist?*

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Abstract: The main allergen responsible for contact dermatitis to nail polish is tosylamide-formaldehyde resin. The so-called hypoallergenic nail polishes are supposedly free of agents that commonly trigger reactions. The commercially available products and their compositions were studied. It was observed that most brands present at least one component capable of triggering the disease; therefore, allergic reaction may occur even when hypoallergenic polishes are used. There should be a proper investigation of the specific allergen through a patch test, because more than one component can cause an allergy, and we need to check the exact composition of each product.

Keywords: Cosmetics; Dermatitis, allergic contact; Contact dermatitis; Products for nails and cuticles

Nail polish was introduced in the early 20th century, and its use remains widespread to this day.¹ In the United States alone, 6.6 billion dollars were spent in 2011, in nail related services, not including additional spending at cosmetic stores and drugstores.² However, over 3% of the population suffers from allergic contact dermatitis (ACD) to its components.³

Most reactions to nail polish and other nail products are triggered by tosylamide-formaldehyde resin (TSFR). This allergen is positive in 6.6% of the contact tests.^{1,4} TSFR is widely used, as its properties promote resistance, flexibility, and shine.¹ After the start of TSFR-free nail polish production, new allergens were discovered that may also trigger dermatitis,^{1,5} such as formaldehyde, polyester resin, dichloroethylene, amyl acetate, phthalates, guanine, acrylate, sulfonamide, and nitrocellulose.^{3,6} Recently, *shellac* (lacquer), an acrylic that promotes long lasting nail polish, has been reported as causing ACD.⁵

Clinical conditions vary. Onychodystrophy, onycholysis, and paronychia may occur; however, in most cases, eczema is noticed on the finger, neck, face, lips, and eyelids.^{1,6} This happens because components are hydrosoluble. Therefore, reaction is not triggered soon after the product is applied, but rather when there is contact with water.⁴ In diagnosing ACD to nail polish, anamnesis and contact tests should be taken into account.¹

Several options of so-called hypoallergenic nail polish, that is, with lower allergenic potential, are currently available. Most of these formulas are free of certain agents, considered the most common sensitizers in the field. However, ACD is always a risk if the

specific allergen causing the condition is not appropriately investigated or if the exact product composition is not checked.

To evaluate the presence of potentially allergenic substances in the so-called hypoallergenic or anti-allergenic nail polishes, this type of nail polish, both national and imported, and their composition were researched in cosmetic stores and drugstores in a major city in Brazil, as well as in websites that sell these products. Allergens researched included toluene, formaldehyde, dibutyl phthalate, TSFR, epoxy resin, and sulfonamide. Data was recorded and compared to those reported in the literature.

Twenty-five brands of national and imported nail polish were found to have *hypoallergenic* or *allergen-free* lines. The composition analysis of each brand revealed that 10 of them (40%) did not have any of the allergens being researched, while 15 of them (60%) had at least one component capable of triggering ACD.

Of the 25 brands, 15 had one or more allergens; 13 (52%) contained epoxy resin; 11 (44%), TSFR; two (8%), formaldehyde; two (8%), *o-p*-sulfonamide; and one (4%), toluene (Table 1).

Contact dermatitis to nail polish is classically caused by TSFR. If this causal relation is identified, one should resort to the use of products that are free of this allergen. However, the data presented here reveal that most of the nail polish brands (60%) considered safe contain in their composition this substance or others that are potentially capable of causing skin reactions, thus leading to the occurrence of undesired reactions in patients who use these products.

ACD to nail polish has been well studied, but the dermatoses caused by the so-called hypoallergenic or allergen-free products

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TABLE 1: Allergens present in hypoallergenic or allergen-free nail polish

Allergen	Number of products	Percentage (n = 25)
Epoxy resin	13	52%
TSFR	11	44%
Formaldehyde	2	8%
o-p-sulfonamide	2	8%
Toluene	1	4%

Note: some products contain more than one allergen

have not been explored, despite their occurrence in clinical practice. In the present work, potential allergens were identified in the analyzed nail polishes. Thus, appropriate regulations must be enforced by the relevant agencies to adjust these products' labels.

Therefore, we conclude that investigation with contact allergy patch testing should also be performed if contact dermatitis to nail polish components is suspected in clinical exams, as it is possible that more than one allergen may be the causing agent. In addition, the composition of products cleared for use by patients diagnosed with ACD to nail polish should also be analyzed in advance, and the labels of so-called hypoallergenic products should not be taken at face value. □

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