

# PRESENT INTERESTS IN ALLERGIC CONTACT DERMATITIS

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**Abstract:** Allergy is a disease in which the positive result of the patch-test is an allergic reaction. Chemical substances exposure may cause sensitisation and allergic reactions to the patch test, not necessarily clinical allergy (for example, allergic contact dermatitis)

**Keywords:** allergic reaction, sensitisation, dermatitis

**Rezumat:** Alergia este o boală în care rezultatul pozitiv al patch-testului este o reacție alergică. Expunerea la substanțe chimice poate cauza sensibilizare și reacții alergice la patch-test dar nu în mod necesar și alergie clinică (de exemplu dermatită de contact alergică).

**Cuvinte cheie:** reacție alergică, sensibilizare, dermatită

## INTRODUCTION

Fragrance was declared the allergen of the year 2007. North American Contact Dermatitis Group (NACDG) classifies it on the fourth place regarding the frequency of allergic patch-test reactions.

Today, the classification of the positive patch-test allergens is the following:

1. Nickel – incidence 16,7%
2. Neomycin – incidence 11,6%
3. Balsam of Peru – incidence 11,6%
4. Fragrances (mixtures) – incidence 10,4%
5. Gold – incidence 10,2%
6. Quaternium 15 – incidence 9,3%.

### Allergic reactions to fragrances and odorizing substances

Within the database of a well known institute of researching the scented materials, there are more than 2800 fragrance ingredients, out of which at least 100 are known as allergens. Fragrances are complex substances: one single fragrance may contain hundreds of different chemical substances. In 1970, an original fragrance mixture (fragrance mix FM I) was created, which is still valid (but in more reduced quantities regarding the component part) and contained the following eight substances: *Evernia prunastri extract (oak tree wax)*, *isoeugenol*, *eugenol*, *cinamal*, *hydroxycitronellal*, *geraniol*, *cinamil alcohol* and *amylcinnamal*. The allergens of FM I could be mainly found in deodorants. Yet, new chemical substances are permanently introduced on the market for products perfuming. In 2005, FM II was created – a mixture based on six constituents, such as:

*citronellol*, *hydroxyisohexyl*, *3-cyclohexene*, *carboxaldehyde (Lyrall)*, *hexyl Cinnamal*, *citral*, *coumarin*, *farnesol*. The research showed that 32% of the patients with positive reactions to FM II (the majority of them were Lyrall-sensitive) had negative reactions to FM I.

The substances included in FM I and FM II are allergens whose labelling on the cosmetics and detergents is compulsory. To these, the following are added: *amilcinamil alcohol*, *Anise alcohol*, *benzyl alcohol*, *benzyl benzoate*, *benzyl cinnamate*, *benzyl salicylate*, *limonene*, *butilfenilmetilpropional (Lilial)*, *linalol*, *methyl 2-octinoat*, *alpha-isomethylion*, *Evernia furfuraceae extract (tree wax)*.

Odorizing products/perfumes mixtures always create problems in the sense that most of the times the individual substances are missing from the mixture, in order to reproduce patch-test positive reactions.

Recently, the European Union has established 26 allergens from fragrances which are necessary to be labelled on the cosmetic products and detergents if they exceed 10 ppm. Labelling helps the allergic patients to the known chemical substances, so that they may avoid the suspected products.

Thanks to the scientific efforts of a large number of researchers in the field of dermatology, toxicology and environment sciences, more than 1100 monographs were published on fragrances ingredients (almost 2800 substances used in industry, out of which 80-90% are synthetic). These studies established the safety standards based on evaluations. The current code of practice of the International Fragrance Association (IFRA) contains more than 100 such standards, out of which 40 forbids certain known fragrances (available information on [www.ifraorg.org](http://www.ifraorg.org)).

In conclusion, a lot of people are allergic to fragrances (have positive patch-test reactions), still few people develop contact allergic dermatitis (as a clinical form of allergy). The dermatologists' advice to avoid the products which contain perfumes known as having positive reactions to certain patients, deprive them of one of the life's pleasures and as a result, further research and new regulations in this respect are expected with large interest.

**Contact allergic dermatitis from colophonium.**

Colophonium reactions may be severe and may occur even after an initial exposure (primary sensitisation). Colophonium is a natural substance obtained by diluting the pine oil and is widely used as an adhesive in the cosmetic product, varnishes, kernels and isolating agents.

The prevalence of colophonium allergy is appreciated in a percentage of 4,6% as a cutaneous sensitizer and as the third main cause of the professional bronchial asthma. There are different degrees of allergisation dependent of the source, way of producing, storage and manipulation. The patch-test to this resin depends on the identification of the mixture component parts. The final product may contain hundreds of distinct chemical products, out of which abietic or silvic acids are predominant (90%). The acid itself is not an allergen, but the compounds made by air oxidation (selfoxidation) are potential allergens (for example *hydroperoxides, peroxides, epoxies and cetons of the abietic acid and dehydroabietic*). According to the commercial applications, colophonium is chemically altered by the dienophils reactions (maleic anhydride, fumaric acid), esterification and hydrogenation. This aspect has a practical importance due to the fact that dienophils resins are more allergic than the hydrogenated ones. The patch-test is more frequently positive to the product chemically altered.

A particular aspect is the contact dermatitis from colophonium in the hair removal products. The detected allergens were: (1) wax altered colophonium derivat and (2) methoxy-polyethylene glycol 22 (PEG 22), dodecyl glycol copolymer and lauryl alcohol. Crossed reactions to colophonium, balsam of Peru, fragrances and cosmetic products were described (due to the fact that all three products contain phenols).

**Contact allergens associated with eyelid dermatitis:**

A North-American study identified a series of contact allergens for eyelid dermatitis, through patch-test. The reactions to nickel, gold and fragrance mixtures are the most frequent.

Example of allergens: *gold sodium thiosulfate, fragrance mixture, Myroxylon pereirae (Balsam of Peru), nickel sulphate,, neomycin, metildibromoglutaronitril, quaternium-15, metilcloroizothiazolynon cobalt chloride, hydantoin, amidoamin, cocamidopropil betaina, thiuram, bacitracin, Cinnamic Aldehyde, d-alpha-tocopherol acetate, formaldehyde resin of tosilamide, propilenglycol, tixocortol pivalate, formaldehyde, colophonium, Ylang ylang, lanolin, tixocortol pivalat metilmacrilate, budesonide.*

Sources for eyelid dermatitis:

- Cosmetics and beauty products
- Mixtures and lotions
- Topic antibiotics
- Jewels
- Fragrances and odorizing products
- Artificial nails
- Insects and arachnidæ

- Sports and entertainment equipment
- Reinforcement and adhesion agents

**Professional dermatitis from acrylates**

Acrylates are synthetical resins which enter in the composition of varnishes and paints. Acylic epoxydic vinyl urethane and formaldehyde resins are agglutinant agents which confer resistance and rapid drying. The solvents represent the volatile component of the varnish or paint, which give the necessary consistence to the product in order to be applied on different surfaces. The specialised literature mentions a prevalence of the contact dermatitis of 6,5% among varnish people (furniture industry) and of 3,9% among painters. Allergic dermatitis lesions may occur as a result of the accidental sprinkle or may affect other areas of the body through the contaminated hands, cloths or tools.

The acrylic polymers are numerous, from elastomers to thermostable plastic. Out of these, monoacrylates, diacrylates and triacrylates have a high sensitisation potential. There is also the possibility of crossed reactions between different acrylates.

It is very important that the product safety data sheet should mention all the types of acrylates, so that the patch-test should be applied on each of them.

Cases of allergic contact dermatitis from acrylates were described in dentistry offices personnel.

In order to avoid sensitisation, the people professionally exposed to acrylates should wear protective gloves, masks and corresponding equipment (clothes and shoes).

Example of acrylates which produced the most frequent and significant allergic reactions: *ethylacrylate, hydroxyethyl acrylate hydroxypropil acrylate, hydroxyethyl methacrylate amd hexandiol diacrylate, diethylenglycole diacrylate, triethylenglycole diacrylate.*

**BIBLIOGRAPHY**

1. Storrs F. J. – Allergen of the Year: Fragrance, Dermatitis 2007, 18 (1): 3-7.
2. Pratt M. D., Belsito D. V., DeLeo V. A. et al – North American Contact Dermatitis Group Patch-Test Results, 2001-2002 study period, Dermatitis 2004, 15: 176-183.
3. Frosch P. J., Rastogi S. C., Pirker C. et al – Patch Testing With a New Fragrance Mix-Reactivity to the Individual Constituents and Chemical Detection in Relevant Cosmetic Products, Contact Dermatitis 2005, 52: 216-225.
4. Smith L., Middleton J., Bickers D., Vey M. – Roles in the Safe Use of Fragrance Materials: RIFM and IFRA’s Process and Guidelines for Fragrance Standards, Perfumer Flavorist 2005, 30: 46-51.
5. Quain R.D., Militello G., Crawford G.H. – Allergic Contact Dermatitis Caused by Colophony in an Epilating Product, Dermatitis 2007, 18 (2): 96-98.
6. Goosens A., Armingaud P. Avenel-Aurdran M. et al – An Epidemic of Allergic Contact Dermatitis Due to Epilating Products, Contact Dermatitis 2002, 46: 67-70.

## ESSAYS

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7. Rietschel R. L., Warshaw E. M., Sasseville D., Fowler J. F. et al – Common Contact Allergens Associated with Eyelid Dermatitis: Data from the North American Contact Dermatitis Group 2003-2004 Study Period, *Dermatitis* 2007, 18 (2): 78-81.
8. Conde-Salazar L., Vargas I., Tévar E., Barchino L., Heras F. – Sensitization to Acrylates in Varnishes, *Dermatitis* 2007, 18(1): 45-48.