

Hair dyes causing allergies and skin irritation



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Hair dyes can cause allergies and skin irritation, due to the oxidative dyes or bleaching agents they contain. It is important to follow the instructions for use, to avoid colouring hair if there has been any reaction to hair dye in the past or if the scalp is irritated, and to consult a healthcare professional in the event of a reaction. If an allergic reaction is suspected, allergy testing can help identify the substance responsible and prevent any new contact. The reporting of adverse effects helps to identify substances not previously known to be responsible for these effects in order to bring about changes in the regulations.

Whether the aim is to hide white hair or simply try out a new look, hair dyes and colour treatments are used by both women and men (who also use them to dye their beards). Some products can be used on eyelashes, but their application is subject to specific conditions. According to the European Commission¹, more than 60% of European women and up to 10% of men dye their hair. A French study published in 2016² indicated that around 64% of the women surveyed reported using hair colouring products.

Depending on how long the user wants the colour to last, various options are available: permanent, semi-permanent or temporary hair dyes.

- "Permanent hair dyes" or "oxidative hair dyes" generally contain an alkaline agent such as ammonia and an oxidising agent such as hydrogen peroxide. They require two products (dye + developer) to be mixed together before application. This category accounts for 70 to 80% of the European colouring products market³.
- Semi-permanent hair dyes contain little or no ammonia and generally no hydrogen peroxide. They are applied directly, without being mixed with a developer.
- Lastly, temporary hair dyes do not contain any oxidising agents. They are applied without any mixing and wash out easily with shampoo.

Hair dyes are used to change or intensify hair colour by adding pigments, whilst bleaches lighten the hair by removing its natural pigments. Their mode of action is therefore different, but they all rely on active chemical substances. Each type of hair dye poses health risks due to the irritating or allergenic properties of its ingredients. This is why the cosmetovigilance scheme⁴ plays a vital role in identifying the adverse health effects of hair products.

ADVERSE EFFECTS THAT ARE OFTEN SERIOUS

Between 2019 and 2025, the cosmetovigilance scheme recorded 124 reports of adverse effects associated with hair colouring and bleaching products, accounting for 6% of all the reports it received. Of these, 40% were reported by consumers, 40% by the companies placing products on the market ("responsible persons"), and

1. https://ec.europa.eu/health/scientific_committees/docs/citizens_hairdyes_en.pdf

2. <https://pubmed.ncbi.nlm.nih.gov/26763610/>

3. https://single-market-economy.ec.europa.eu/sectors/cosmetics/cosmetic-products-specific-topics/hair-dye-products_en

4. https://vigilanses.anses.fr/sites/default/files/VigilAnses_N23_Cosmetovigilance_Sept2024.pdf

20% by healthcare professionals (doctors, pharmacists, staff at poison control centres, etc.).

Reports about hair colouring and bleaching products accounted for 41% of all reports concerning hair products, with the remaining 59% (n=175) relating to shampoos, straightening and smoothing products, and haircare products (oils, masks, serums).

Among the reports of adverse effects associated with hair colouring and bleaching products, 91% (n=113) were due to "oxidative hair dyes", of which 63% (n=71) were considered serious in the context of cosmetovigilance, i.e. leading to temporary or permanent functional incapacity or hospitalisation. By way of comparison, for the cosmetovigilance reports taken as a whole, this percentage was 36%. Non-oxidative hair dyes (for temporary colour changes) accounted for 9% of reports (n=11), a third of which (i.e. 4 cases) were also deemed to be serious. These data show that even non-oxidative hair dyes can cause reactions, some of which are serious.

The reports mentioned reactions affecting the scalp, face and/or eyes. Concerning the scalp, the reported symptoms included burning sensations, itching, tingling, irritation, redness, eczema and even hair loss. On the face, users reported redness, a sensation of heat, swelling, oedema and red blotches, sometimes affecting the entire face.

A few reports (n=8) mentioned a swollen throat accompanied by genuine breathing difficulties, signs of a severe allergic reaction that could pose an immediate life-threatening risk to the exposed person.

Consumers are not the only ones affected by these adverse effects. Six cosmetovigilance reports concerned hairdressing professionals: two mentioned skin disorders affecting the hands, while four reported respiratory conditions. Allergic reactions therefore also occur among hairdressing professionals, even with so-called "natural" hair dyes, as documented by the National Network for Monitoring and Prevention of Occupational and Environmental Diseases (RNV3PE⁵).

Reports received by the cosmetovigilance scheme between 2019 and 2025 rarely mentioned allergy tests being performed (n=12, 10% of reports), despite this being the only way to identify the substance responsible for the allergic reaction. When these tests were carried out, they indicated sensitisation to various authorised ingredients commonly used in hair colouring products.

Five people were allergic to a single ingredient, namely p-phenylenediamine (PPD) alone (two reports), toluene-2,5-diamine sulphate (one report) or persulphates (two reports).

Seven people were allergic to several ingredients. These included m-aminophenol in combination with either

PPD and toluene-2,5-diamine sulphate (one report); PPD and nickel sulphate (one report); or PPD, nickel sulphate and toluene-2,5-diamine sulphate (one report). Benzyl alcohol was also found in combination with other allergens: hydroquinone, ammonium persulphate, nitro-p-phenylenediamine, p-aminophenol and hydroxyethyl-p-phenylenediamine sulphate.

WHAT DO THE REGULATIONS SAY?

Under Regulation (EC) No 1223/2009 on cosmetic products, manufacturers are required to ensure that the safety of all ingredients has been assessed before the product is placed on the market. This assessment must be documented in a product information file (PIF) made available to the competent authorities⁶ upon request. Where a substance gives rise to concerns, the European Commission may consult the Scientific Committee on Consumer Safety (SCCS), which then assesses the risks and issues an opinion on its safety.

The European Regulation sets out⁷ the prohibited substances (Annex II) and the restricted substances (Annex III), specifying the product type, the body parts to which the restrictions apply, the maximum permitted concentration in ready-for-use preparations, and the wording of conditions of use and warnings.

If a hair dye contains substances such as PPD, 2,5 toluenediamine sulphate or m-aminophenol, its packaging must carry certain warnings such as *"Can cause severe allergic reactions"*; *"Not intended for use on persons under the age of 16"*.

Similarly, products containing hydrogen peroxide must state *"Wear suitable gloves"* and, in the case of products intended for use on eyelashes, must specify *"For professional use only"*.

The annexes to the Regulation are updated regularly to ensure that they always reflect the latest scientific and cosmetovigilance data. If new data suggest a high risk for certain substances, their use may be limited, their scope restricted (for example, a ban on their use on eyelashes), or their placing on the market prohibited, based on the opinions issued by the SCCS. A Member State may refer a matter to the European authorities to request a risk assessment for a substance, which may lead to the Regulation being amended. The collection of adverse effects through the cosmetovigilance scheme plays a key role: where appropriate, these effects will contribute to the safety of the ingredients in question being reassessed.

Regarding the cases recorded by the cosmetovigilance scheme in France between 2019 and 2025, all the substances implicated in hair colouring or bleaching products were on the list of substances authorised by the Regulation.

5. https://vigilanses.anses.fr/sites/default/files/VigilAnses_N22_Hairdyes.pdf

6. This is ANSES and the DGCCRF.

7. <https://ec.europa.eu/growth/tools-databases/cosing/reference/annexes/list/II>

HOW CAN THE RISKS BE LIMITED?

Plusieurs précautions permettent de limiter les risques. Several precautions can be taken to limit the risk of adverse effects when using hair dye. The first is to check the information that must appear on product labels, depending on their composition (see above).

It is also advisable to avoid colouring hair in the following cases:

- any reaction after colouring hair in the past,
- any reaction in the past to a temporary black henna tattoo, which is known to cause long-lasting skin sensitisation to certain compounds such as PPD,
- any facial rash or sensitive, irritated or damaged scalp.

In 2021, the French National Agency for Medicines and Health Products Safety (ANSM⁸) published a set of recommendations on the correct use of permanent hair dyes intended for consumers⁹. In these recommendations, it sets out guidelines to be followed strictly and urges caution even if products are labelled "PPD-free" or "ammonia-free", as there may be other ingredients that cause reactions. ANSM advises keeping the product packaging for one month after use in case of any reaction.

Lastly, ANSES recommends following the product instructions carefully. Any failure to follow the instructions for use (or any misuse) may increase the risk of adverse effects. This was the case in four of the cosmetovigilance reports: in one case, the application time had not been observed (30 minutes instead of five), and in the other three, the products had been used on minors (two 13-year-olds and one 15-year-old), despite the label stating that the product must not be used on persons under the age of 16.

WHAT ABOUT THE PATCH TEST?

The 1951 Act on cosmetic products included a requirement to carry out a "patch test" before using a hair dye. This test should be carried out 48 hours before dyeing, by applying a small amount of dye to the skin – for example in the elbow crease or behind the ear – and refraining from washing the area for 48 hours (protecting it with a plaster if necessary); any itching, redness or rash in this area within 48 hours contraindicated the use of this hair product.

This practice has not been mandatory since 2001, but manufacturers continue to recommend it on their product packaging. Certain hairdressers also insist on it before dyeing a customer's hair, due to a fear of legal action if it is not carried out and a severe allergic reaction occurs, since the manufacturer has stated that it is mandatory.

Nevertheless, the SCCS ruled against this practice in September 2019¹⁰ following a study carried out on a panel of consumers. In this study, when the consumer was well-informed, the test patch protocol yielded results equivalent to those obtained by an expert dermatologist. In the SCCS's view, as the study participants were probably not representative of the general population, the test's effectiveness in terms of its general applicability to all consumers remained to be demonstrated.

Moreover, the SCCS considered that the test's potentially moderate sensitivity raised the possibility of false-negative reactions in consumers who were nevertheless sensitised, and who might then suffer from allergic contact dermatitis following the subsequent application of a product.

The SCCS considered that carrying out a patch test prior to dyeing not only carried the same risk of skin sensitisation as applying the product to the entire head of hair, but also increased the number of exposures.

WHAT SHOULD BE DONE IN THE EVENT OF A REACTION?

If, despite taking the precautions described here, you experience a reaction after using hair dye:

- Call the emergency services (15 in France) or a poison control centre in the event of a severe reaction (breathing difficulties, laryngeal oedema, etc.), stating the name of the product involved.
- Consult a healthcare professional if you suspect an allergy: allergy tests will confirm this and can identify the substance responsible, enabling it to be avoided in future.
- Report the incident on the Ministry of Health's adverse health events reporting portal (<https://signalement.social-sante.gouv.fr/>). This notification enables the authorities to monitor cosmetic product safety and, where necessary, to take measures to protect consumers.

CONCLUSION

Hair dyes are widely used but are not without risks. Certain substances, such as oxidative dyes or bleaching agents, can cause allergic reactions that are sometimes serious.

Given these risks, it is essential to follow the instructions on the packaging or leaflet (precautions and instructions for use) and to remain alert to any unusual reaction. If a reaction should occur, getting an allergist to identify the substance responsible could help prevent further episodes.

8. Until December 2023, the cosmetovigilance scheme in France was operated by ANSM. It was transferred to ANSES on 1 January 2024.

9. https://ansm.sante.fr/uploads/2021/03/11/0e7b1006d4bf0500e3ac7ef489ebdea6.pdf?utm_com

10. https://health.ec.europa.eu/document/download/b103410d-cd6e-4b3b-ba58-cabfdb4ad9a1_fr

The European regulations governing the composition, labelling and safety of hair colouring products are regularly reviewed, in particular thanks to cosmetovigilance data. The adverse effect reports submitted via the Ministry of Health's reporting portal therefore contribute to the ongoing monitoring of cosmetic products, the identification of substances posing a risk, the strengthening of restrictions where necessary, and improved safety for all users.



**Élodie Lontsi
and Abir Aachimi (ANSES)**

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