

Contact urticaria syndrome caused by direct hair dyes in a hairdresser

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Case Report

A 57-year-old woman, formerly employed as a hairdresser but still practising in her spare time, presented to us with eczema of the hands and feet in November 2012. Previous patch testing had shown contact allergies to *p*-phenylenediamine (PPD), nickel, chromium, cobalt, and colophonium, all of which are relevant for intolerance to hair dyes, jewellery, and shoes.

In her history, she mentioned a history of severe itching on the hands and in the ears, accompanied by a 'bad taste' in the mouth, immediately following the application of Colorplix® beige nacré (L'Asco, Brussels, Belgium) to a client's scalp.



Fig. 1. Prick testing with Colorplix® resulting in a strong positive reaction within 15 min following the test.

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Additional patch testing was performed, resulting in positive test reactions to *p*-toluenediamine (cross-reacts with PPD), methyldibromo glutaronitrile (actual relevance not known), and several extracts of so-called 'hypoallergenic leather'.

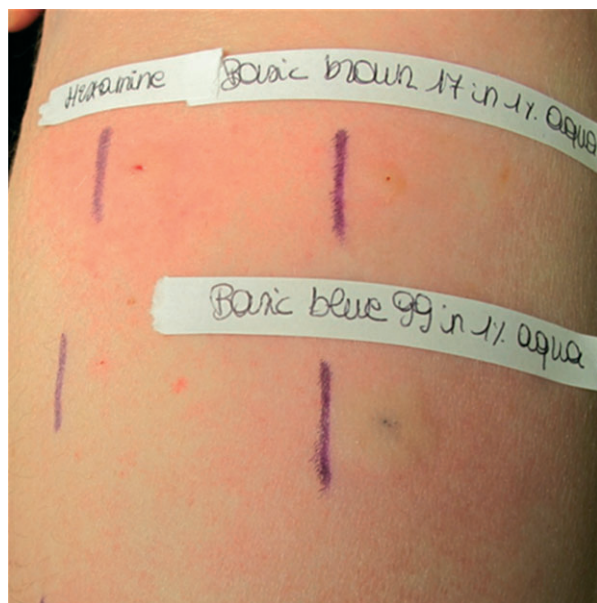


Fig. 2. Strong positive prick test reactions to both Basic Blue 99 1% aqua (+++, > histamine) and Basic Brown 17 1% aq. (++ = histamine).

Prick testing with Colorplix® was also performed, with histamine and physiological serum as controls, and resulted in a strong positive reaction within 15 min following the test (Fig. 1). Additional prick tests with all ingredients of Colorplix® beige nacré, provided by the company, showed strong reactions to both Basic Blue 99 1% aq. (+++, > histamine) and Basic Brown 17 1% aq. (++ = histamine) (Fig. 2). Two months later, we repeated the prick test with the latter dye separately, which again resulted in the same test result. Patch testing with the same components remained negative.

Additionally, the Colorplix® solution was separated by thin-layer chromatography (TLC) at the Malmö department, with the thin-layer chromatograms being prepared according to a procedure previously described by Bruze et al. (1). Prick tests were performed with each spot (moistened with physiological serum) of the TLC strips (one made from the concentrated solution and one from the diluted solution): after moistening, the TLC strip was held against the skin, and a minute amount of the silica gel corresponding to each spot through which the prick was performed was scraped off.

The patient showed immediate positive reactions to the main spots of both the concentrated and the diluted TLC strips, as well as to some other spots of the concentrated TLC strip (Fig. 3a,b).

Further analysis and testing was not performed.

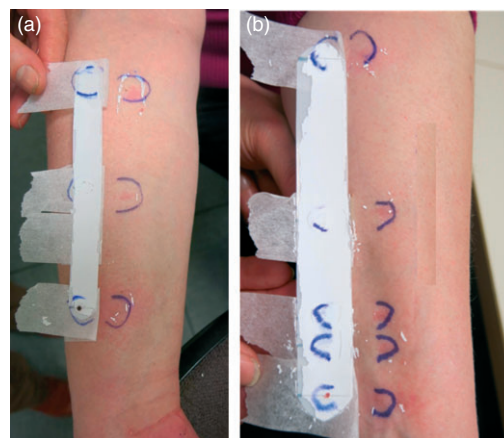


Fig. 3. Immediate positive reaction to the main spots as well as to some other spots of both the concentrated and the diluted thin layer chromatograms of Colorplix®.

Discussion

Basic Blue 99 (a mixture of 23–32 substances at various concentrations and with varying composition) is used as a direct hair dye substance in temporary or semi-permanent hair dye formulations, with a maximum on-head concentration of 1.0% [Scientific Committee on Consumer Safety (SCCS) Opinion on Basic Blue 99, SCCS, COLIPA no. C59, 2011]. Several cases of immediate-type allergy to this hair dye, also in hairdressers, have been reported in the literature (2–5).

Basic Brown 17 is an (impure) azo dye. According to SCCS, a conclusion on sensitisation cannot be drawn; it considers Basic Brown 17 safe for use in non-oxidative hair dye formulations with a concentration of maximum 2.0%, apart from its possible sensitisation potential (SCCS Opinion on Basic Brown 17. Colipa no B007 SCCS/1531/14, adopted 27 March 2014). However, we did not find any report of immediate-type or delayed-type sensitivity to it.

Conclusion

We were able to identify both Basic Blue 99 and Basic Brown 17, both of which are impure direct hair dyes, as the allergenic culprits present in hair colouring product causing symptoms of the contact urticaria syndrome in this patient. We also showed that thin-layer chromatograms can be used not only for patch testing but also for prick testing. The reactions to several spots as well as the main spots indicate that the patient is probably also sensitized to some impurities present. Further analyses could perhaps have identified the responsible allergens; however, the patient lost interest, and further investigations could not be carried out.

References

- 1 Bruze M, Frick M, Persson L. Patch testing with thin-layer chromatograms. *Contact Dermatitis* 2003; **48**: 278–279.
- 2 Davari P, Maibach H. Contact urticaria to cosmetic and industrial dyes. *Clin Exp Dermatol* 2011; **36**: 1–5.
- 3 Jagtman B A. Urticaria and contact urticaria due to basic blue 99 in a hair dye. *Contact Dermatitis* 1996; **35**: 52.
- 4 Wigger-Alberti W, Elsner P, Wüthrich B et al. Immediate-type allergy to the hair dye basic blue 99 in a hairdresser. *Allergy* 1996; **51**: 64.
- 5 de Groot A C. Cosmetic allergy from the aminoketone colour basic blue 99 (CI 56059). *Contact Dermatitis* 1990; **23**: 56–57.