

Allergic contact dermatitis due to butylene glycol in cosmetics

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Allergy to butylene glycol (BG), also called 1,3-butylene glycol (CAS no. 107–88-0), has been considered rare, but may be overlooked as it is not routinely tested.

CASE REPORT

A 62-year-old man presented to our department for patch testing after two episodes of severe facial dermatitis. The first episode followed occasional use of Nivea soft facial cream over a period of 2 years, with a progressively worsening skin reaction. The second followed a one-time application of Matas Mens Anti Age Face Gel. After both episodes he was treated successfully with systemic prednisolone and antibiotics because of superinfection. Before referral, use tests with both products had been performed with a positive outcome. Two patch tests had been attempted but were inconclusive because of what was perceived to be “angry back” syndrome.

The patient was patch tested in our department with the European Baseline Series, a series of the 26 fragrance allergens that manufacturers must declare on cosmetics, and a locally composed facial series. Patch tests were also performed of the ingredients that were common to the two products (Nivea cream and Matas face gel) including BG 2% aq. (obtained from Sigma-Aldrich, Germany; prepared in our own lab), using Finn chambers and Scanpor tape (Epitest, Tuusula, Finland) and occlusion for 2 days (D). Readings were made at D2, D5, and D7 and scored according to ESCD guidelines.¹ Positive reactions were seen to fragrance mix I with sorbitan sesquileate (+ on D7) and BG (+ on D5 and D7). Only the facial cream contained perfume, while both the patient's products (Nivea cream and Matas face gel) contained BG. The patient was advised to avoid future use of products containing perfume or BG and has not had any rash since.

DISCUSSION

Butylene glycol is a viscous liquid, a solubilizer, a good humectant, and has antimicrobial properties. Because of these characteristics it is used in various cosmetics and in topical medications. We used a test concentration of 2% aq., but up to 10% has been used with no sign of irritancy when tested in 20 healthy controls.² To date, around 20 publications on allergic contact dermatitis due to BG have been published. Most are case studies and originate predominantly from Japan, while two are from Europe.^{2,3} Two cases were reported from Belgium,² both due to the use of the same super-tanning cream containing BG, and one from Germany³ where BG was an ingredient of an eyeliner. In two older group studies from Japan,^{4,5} 1/272 (0.4%) and 9/758 (1.2%) patients respectively suspected of having contact dermatitis due to cosmetics were allergic to BG. In one case, contact allergy originated from the use of an antifungal cream.⁶

It has been hypothesized that allergy to BG is increasing in Japan, both because it may be more frequently used in cosmetics and because it may be used in higher concentrations than previously.⁷ Product use concentrations of BG of up to 33% have been reported from Japan.⁸ We have no information on the concentration of BG in the patient's products, but there is no restriction on the use of BG in the Cosmetic Regulations in the European Union. We have now included BG in our patch test series for facial dermatitis, to investigate whether this is an overlooked allergen.

AUTHOR CONTRIBUTIONS

Maria Blomberg: Conceptualization; data curation; formal analysis; investigation; project administration; writing-original draft.
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REFERENCES

1. Johansen JD, Aalto-Korte K, Agner T, et al. European Society of Contact Dermatitis guideline for diagnostic patch testing – recommendations on best practice. *Contact Dermatitis*. 2015;73(4):195-221.
2. Diegenant C, Constandt L, Goossens A. Allergic contact dermatitis due to 1,3-butylene glycol. *Contact Dermatitis*. 2000;43(4):234-235.
3. Magerl A, Pirker C, Frosch PJ. Allergic contact eczema from shellac and 1,3-butylene glycol in an eyeliner. *J Dtsch Dermatol Ges*. 2003;1(4):300-302.
4. Matsunaga K, Sugai T, Katoh J, et al. Group study on contact sensitivity of 1,3-butylene glycol. *Environ Dermatol*. 1997;4(3):195-201. (in Japanese, quoted in ⁷).
5. Sugiura M, Hayakawa R, Kato Y, Sugiura K, Hashimoto R, Shamoto M. Results of patch testing with 1,3-butylene glycol from 1994 to 1999. *Environ Dermatol*. 2001;8(1):1-5. (in Japanese, quoted in ⁷).
6. Oiso N, Fukai K, Ishii M. Allergic contact dermatitis due to 1,3-butylene glycol in medicaments. *Contact Dermatitis*. 2004;51(1):40-41.
7. Aizawa A, Ito A, Masui Y, Ito M. Case of allergic contact dermatitis due to 1,3-butylene glycol. *J Dermatol*. 2014;41(9):815-816.
8. Takahashi S. A case of contact dermatitis due to 1,3-butylene glycol. *Nishinohon J Dermatol*. 2001;63(2):141-144. (in Japanese, quoted in ⁷).

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