

Allergic contact dermatitis caused by betulin-containing triterpene extract from the outer bark of birch (*Betula alba*)

Ulf Meyer-Hoffert and Jochen Brasch

Department of Dermatology, Allergology and Venerology, University Hospitals of Schleswig-Holstein, 24105 Kiel, Germany

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Case Report

Four months after starting to use Imlan® Creme Pur (Birken AG, Niefern-Öschelbronn, Germany) for his skin

care, a 51-year-old metalworker developed itchy erythema and papules on his hands and face. Topical application of glucocorticosteroids resulted in only transient relief followed by relapses after discontinuation. Two years previously, this patient had been diagnosed with occupational allergic contact dermatitis of the hands. Patch testing had shown sensitization to colophonium, formaldehyde, methylisothiazolinone, propolis, ylang-ylang oil, cocamidopropyl betaine, and benzoyl peroxide. Since then, the patient had strictly avoided any contact with these allergens.

Correspondence: Ulf Meyer-Hoffert, Department of Dermatology, University Hospitals of Schleswig-Holstein, Campus Kiel, Schittenhelmstraße 7, 24105 Kiel, Germany. Tel: +49 431 597 1513; Fax: +49 431 597 1611. E-mail: umeyerhoffert@dermatology.uni-kiel.de

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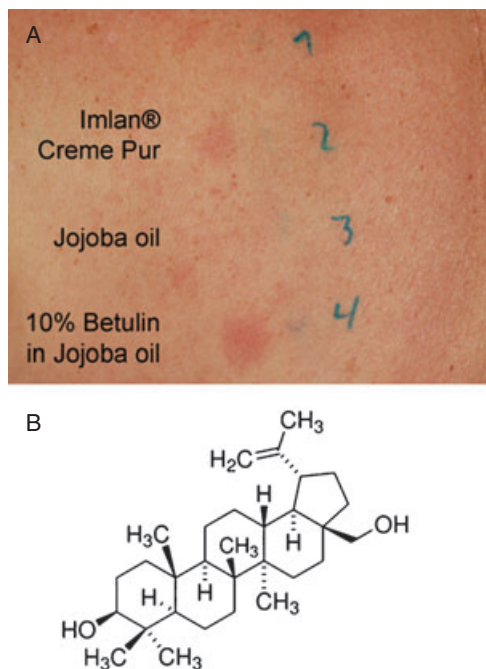


Fig. 1. (a) Patch test reactions to Imlan® Creme Pur, 100% jojoba oil and 10% birch bark extract (betulin) in jojoba oil on D2. (b) Chemical structure of betulin.

Because the patient's working conditions had remained unchanged, his newly introduced skin care products were suspected to be the cause of his recent dermatitis. Patch tests were performed with Imlan® Creme Pur. In accordance with common guidelines (1), small Finn Chambers® on Scanpor® tape (SmartPractice, Phoenix, AZ, USA) were attached for 1 day to the patient's back. Positive allergic reactions were classified as weak (+), moderate (++), or strong (+++) (1). A positive reaction resulted from Imlan® Creme only (+ on D1, and ++ on D2 and D3).

The patient then replaced Imlan® Creme Pur with another skin care product, and his skin permanently cleared.

According to the manufacturer, Imlan® Creme Pur contains the following ingredients: 5% birch (*Betula alba*)

bark extract, 50% jojoba (*Simmondsia chinensis*) oil, and 45% water. Therefore, 4 months after healing of the patient's dermatitis, further patch tests were performed as described above, with the following ingredients provided by the manufacturer: 100% jojoba oil and 10% birch bark extract in jojoba oil. Ten per cent birch bark extract in jojoba oil resulted in a + reaction on D1, a ++ reaction on D2 (Fig. 1a), and a ++ reaction with local spreading on D3; 100% jojoba oil was negative.

Discussion

According to the manufacturer, the tested birch bark extract consists of betulin (80% wt/wt) plus some other triterpenes, such as betulinic acid (CAS number 472-15-1) (3% wt/wt) and lupeol (CAS number 545-47-1) (2% wt/wt) (2). Betulin [lup-20(29)-ene-3 β ,28-diol; CAS number 473-98-3] is a widely used and naturally occurring triterpene commonly isolated from the bark of birch trees. The function of betulin in the bark is unknown. Chemically, betulin is a triterpenoid with a lupane structure. It has a pentacyclic ring structure and hydroxyl groups in positions C3 and C28 (Fig. 1b) (2). Triterpenes are quite attractive pharmacological substances, with antiphlogistic and antiproliferative effects (3). Imlan® Creme Pur has been approved as a medical skin care product. It is free of emulsifiers, preservatives, dyes, and lanolin, and is therefore an alternative skin care product for patients with polysensitivity.

As betulin is the major triterpene in Imlan® Creme Pur, we strongly suppose that this agent was the relevant allergen in our case; however, we cannot exclude the possibility that an admixed different triterpene could have been the culprit, especially as botanical ingredients are common, and may not be suspected, because they are 'natural'. Up to now, no contact allergy to Imlan® Creme Pur and betulin has been reported. With this communication, we want to draw attention to the possibility that this cream can, in fact, elicit contact allergy, most likely to betulin, despite the anti-inflammatory pharmacological effects of betulin.

References

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