

# Photoallergic contact dermatitis caused by wooden catholic bracelets: A report of two cases

Annarita Antelmi<sup>1</sup>  | Cecilia Svedman<sup>1</sup> | Magnus Bruze<sup>1</sup> | Erik Zimerson<sup>1</sup> | Antonella Aresta<sup>2</sup> | Guiseppe E. De Benedetto<sup>3</sup> | Carlo Zambonin<sup>2</sup> | Michelangelo Vestita<sup>4</sup> | Paolo Romita<sup>5</sup>  | Caterina Foti<sup>5</sup>

<sup>1</sup>Department of Occupational and Environmental Dermatology, Skåne University Hospital, Lund University, Malmö, Sweden

<sup>2</sup>Department of Chemistry, University of Bari, Bari, Italy

<sup>3</sup>Department of Cultural Heritage, University of Salento, Lecce, Italy

<sup>4</sup>Division of Plastic and Reconstructive Surgery, Department of Emergency and Organ Transplantation, University of Bari, Bari, Italy

<sup>5</sup>Department of Biomedical Science and Human Oncology, Dermatologic Clinic, University of Bari, Bari, Italy

## Correspondence

Annarita Antelmi, Department of Occupational and Environmental Dermatology, Skåne University Hospital, Jan Waldenströmsgata 16 205 02 Malmö, Sweden.  
Email: annarita.antelmi@gmail.com

**KEYWORDS:** *Brosimum* wood, case report, catholic bracelet, coumarins, patch test, wood

Wood is used to manufacture furniture, household utensils, musical instruments, and ornaments such as crafts jewelry. Occupational dermatitis can occur in woodcutters, carpenters, and joiners because they are exposed to sawdust.<sup>1</sup> The repeated contact with finished wood products can cause allergic contact dermatitis (ACD), as reported for professional or amateur musicians.<sup>2</sup> ACD can also occur due to the use of wooden furniture, furnishing, bracelets, and necklaces.<sup>3–6</sup>

## 1 | CASE REPORTS

Two female patients, 26 and 34 years old, presented to the Dermatology Clinic in Bari, Italy, with acute eczema mainly localized on the right forearm with spreading to the back of the hand (Figure 1). The history revealed that in summertime both patients had worn a kind of catholic bracelet called memorabilia made of wooden chunks with impressed iconic religious images (Figure 1). Bracelets were immediately removed. Application of topical corticosteroids in both patients led to the resolution of dermatitis within 10 days.

Three months afterward, the patients were patch tested with the SIDAPA (Italian Society of Allergological, Occupational and Environmental Dermatology) baseline series (Firma, Florence, Italy). Patch tests were applied on the back and left in occlusion for 2 days using Finn Chambers (SmartPractice, Phoenix, Arizona) on Scanpor tape (Norgesplaster, Vennesla, Norway), and readings were made on day (D) 2, D4, and D7. Photopatch tests were also performed with the European photopatch test series and with wooden sawdust obtained

from both bracelets and tested 5% in pet. Photopatch tests were carried out by applying the allergens on one side of the back, taking the Scanpor tape off on D2 and exposing the area to UVA at the dose of 5 J/cm<sup>2</sup> (UV 801 KL, PUVA/TL01, photochemotherapy; Herbert Waldman, Villingen-Schwenningen, Germany), whereas the opposite side of the back was covered with a black cloth. Tests were read on D4 and D7. The reactions were classified according to ESCD guidelines.<sup>7,8</sup> Patch tests and photopatch tests results with the baseline series were negative, whereas photopatch tests with wooden sawdust 5% pet. yielded a positive reaction (++) in both patients, each of whom was tested with their own material.

In a next step, patch testing with thin-layer chromatography (TLC) strips was performed according to the procedure described by Bruze et al.<sup>9</sup> Ultrasonic extracts of the wooden bracelets were prepared with acetone and used for TLC performed in the Department of Occupational and Environmental. The extract was applied on TLC strips cut from a Merck TLC silica gel 60 F254 plastic roll (Darmstadt, Germany). The TLC sheet was developed in a mobile phase consisting of heptane and water 80/20 (vol/vol). The TLC strips were inspected under ultraviolet light at 254 and 366 nm. The visualized spots were marked with a pencil. TLC strips were prepared in the laboratory in Malmö and delivered in Dermatology Clinic at Policlinico of Bari in 3 days. They were wrapped in aluminum foil and stored in a refrigerator until were used for patch testing. Both patients were patch and photopatch tested with the TLC strips and the acetone extract made from their own bracelets. While patch tests results were negative, the photopatch test showed a positive reaction to the same spot in both



**FIGURE 1** (A,B) Eczematous lesions on the wrist of the two patients



**FIGURE 2** Positive allergic reaction to one spot in the photopatch test with thin-layer chromatography strips and with extracts of the wooden bracelet in patient 1, test reading on day 4 (D4)

patients (Figure 2). The spot corresponding to the skin reaction was scraped off and extracted in acetone and analyzed by gas chromatography-mass spectrometry (GC-MS). Two coumarin compounds were identified in the TLC spot, namely, 8,8-dimethyl-2H,8H-benzo[1,2-b:3,4-b']dipyran-2-one and 8,8-dimethyl-2H,8H-benzo[1,2-b:5,4-b']dipyran-2-one. The wood used for making the bracelets was identified using light microscopy analysis, which was performed at the Laboratory of Wood Technology, University of Bari. Both bracelets were made from *Brosimum* wood.

## 2 | DISCUSSION

Religious symbols in various forms, including wooden bracelets, are widely sold all over the world. In particular, catholic bracelets have gained large popularity also among younger people because of their symbolic significance and low cost.

*Brosimum* is a genus of plants in the Moraceae family, which is native to the tropical regions of South America. Species of the Moraceae family are also popular in medicine and phytotherapy because of the presence of compounds with proven biological activity, such as flavonoids and coumarins.<sup>10</sup> The *Brosimum* genus is high in coumarin; besides coumarins, bergapten and other psoralens are also found in these genera, as in the case with *Brosimum rubescens*<sup>11</sup> or *Brosimum gaudichaudii* wood.<sup>12</sup>

Few cases of contact dermatitis to wooden bracelets have been reported.<sup>6,13-15</sup> Two of these described cases of contact allergy to wooden bracelets and suggested benzoquinones called dalbergiones to be the potential culprit agents.<sup>6,13</sup> In one case of photocontact allergy to bracelets of *Brosimum* wood, quinolones or psoralens were suggested as causative photoallergens.<sup>14</sup> In another case, ACD to a wooden bracelet made of *Grevillea robusta*, a tropical wood of the Proteaceae family, was reported and grevillol, the main constituent of the benzene extract of this wood, was suspected to be the possible cause of the reaction.<sup>15</sup>

In our case, thanks to the combination of clinical and chemical analyses, which involved patch testing and photopatch testing with TLC strips, and chemical investigation of the TLC spots and of the acetone extract of wooden bracelets with GC-MS, respectively, we identified two coumarins (8,8-dimethyl-2H,8H-benzo[1,2-b:3,4-b']dipyran-2-one and 8,8-dimethyl-2H,8H-benzo[1,2-b:5,4-b']dipyran-2-one) as possible cause of photoallergic contact dermatitis caused by wooden catholic bracelets made using *Brosimum* wood. To our knowledge, this is the first case in which the importance of using TLC and GC-MS analysis to identify photoallergens is highlighted.

## ACKNOWLEDGEMENTS

The authors thank Professor Achille Pellerano, Laboratory of Wood Technology, University of Bari, for his valuable contribution in identification of wood.

## AUTHOR CONTRIBUTIONS

**Annarita Antelmi:** writing. **Cecilia Svedman:** General supervision. **Caterina Foti:** conceptualization. **Magnus Bruze:** Conceptualization; supervision. **Erik Zimerson:** Chemical analysis. **Antonella Aresta:** Investigation; methodology. **Guiseppe E. De Benedetto:** Technical support. **Carlo Zambonin:** Formal analysis; supervision. **Michelangelo Vestita:** Data curation. **Paolo Romita:** data collecting. **Caterina Foti:** conceptualization.

## CONFLICT OF INTEREST

All authors have no interests to report.

## ORCID

Annarita Antelmi  <https://orcid.org/0000-0002-5067-2564>

Paolo Romita  <https://orcid.org/0000-0002-5559-9722>

## REFERENCES

1. Rojas-Hijazo B, Lezaun A, Hausen BM, Segura N, Garcés M, Colás C. Airborne contact dermatitis in gaitas (flageolets) constructors after exposure to sawdust of caviuna. *Contact Dermatitis*. 2007;56(5):274-277.
2. Crépy MN. Skin diseases in musicians. *Eur J Dermatol*. 2015;25(5):375-383.
3. Litvinov IV, Sugathan P, Cohen BA. Recognizing and treating toilet-seat contact dermatitis in children. *Pediatrics*. 2010;125(2):e419-e422.
4. Ingram JR, Gasson P, Hughes TM, Stone NM. A bum deal from wooden toilet seats: reemergence of allergic contact dermatitis. *Dermatitis*. 2012;23(5):244-245.
5. Huilaja L, Kubin ME, Riekk R. Contact allergy to finished woods in furniture and furnishings: a small allergic contact dermatitis epidemic to western red cedar in sauna interior decoration. *J Eur Acad Dermatol Venereol*. 2015;30(1):57-59.
6. Gómez-Muga S, Ratón-Nieto JA, Ocerin I. An unusual case of contact dermatitis caused by wooden bracelets. *Contact Dermatitis*. 2009;61(6):351-352.
7. 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.
8. Gonçalo M, Ferguson J, Bonevalle A, et al. Photopatch testing: recommendations for a European photopatch test baseline series. *Contact Dermatitis*. 2013;68(4):239-243.
9. Bruze M, Frick M, Persson L. Patch testing with thin-layer chromatograms. *Contact Dermatitis*. 2003;48(5):278-279.
10. Luz R, Vieira I, Braz-Filho R, Moreira V. 13C-NMR data from Coumarins from Moraceae family. *Am J Analyt Chem*. 2015;6(11):851-866.
11. Takashima A, Yamamoto K, Kimura S, Takakuwa Y, Mizuno N. Allergic contact and photocontact dermatitis due to psoralens in patients with psoriasis treated with topical PUVA. *Br J Dermatol*. 1991;124(1):37-42.
12. Ljunggren B. Psoralen photoallergy caused by plant contact. *Contact Dermatitis*. 1977;3(2):85-90.
13. Moratinos MM, Tevar E, Conde-Salazar L. Contact allergy to a cocobolo bracelet. *Dermatitis*. 2005;16(3):139-141.
14. Serrano P, Medeiros S, Quilhó T, Santos R, Brandão FM. Photoallergic contact dermatitis to brosimum wood. *Contact Dermatitis*. 2008;58(4):243-245.
15. Hoffman TE, Hausen BM, Adams RM. Allergic contact dermatitis to "silver oak" wooden arm bracelets. *J Am Acad Dermatol*. 1985;13(5 Pt 1):778-779.

**How to cite this article:** Antelmi A, Svedman C, Bruze M, et al. Photoallergic contact dermatitis caused by wooden catholic bracelets: A report of two cases. *Contact Dermatitis*. 2020;1-3. <https://doi.org/10.1111/cod.13539>