

Sesquiterpene Lactone–Related Allergic Contact Dermatitis After Exposure to Tulip Poplar Wood and Bark

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PRECIS

We call attention to several wood species that may serve as sources of sesquiterpene lactone allergy.

DISCUSSION

Sesquiterpene lactones (SLs) are naturally occurring plant compounds that are capable of inducing allergic contact dermatitis (ACD). More than 1000 SL structures have been identified, mostly within the Compositae family of plants, which includes ragweed, feverfew, pyrethrum, chrysanthemum, tansy, and chamomile, among many others.

A 59-year-old man was referred to our clinic with a chief complaint of a rash on his eyelids that had manifested 4 times in the last 9 months. The patient stated that the dermatitis first appeared after he began removing bark from trees to make walking sticks from tulip poplar, oak, mulberry, and maple wood. He had previously been prescribed a topical steroid cream, which was only slightly helpful in ameliorating his symptoms, and he reported that the rash would promptly recur after stripping trees. On physical examination, there were erythematous, lichenified plaques with mild scaling on his bilateral upper and lower eyelids, sparing the nasal bridge and extending to the zygomatic prominence on each side.

The patient underwent patch testing with an expanded North American standard tray (Chemotechnique Diagnostics, Malmö, Sweden) and samples of tree bark and wood chips. The tested tree components included the following: pine wood, ironwood wood, mulberry bark and wood, holly bark and wood, oak bark and wood, poplar bark and wood, and maple bark and wood. In addition, the polyurethane that he used to seal his walking sticks was

tested. At the 96-hour reading, the patient had positive reactions to SL mix (+3), poplar wood (+1), poplar bark (+3), maple wood (+1), and maple bark (+1). Five control patients all tested negative to the same poplar and maple tree components. The patient's dermatitis resolved with avoidance of poplar and maple wood.

Quinones are well-known wood sensitizers that are present in a wide variety of species, including cocobolo, teak, primrose, mahogany, and Brazilian rosewood.¹ Terpenes, phenols, and resins are other components within wood that have also been found to cause ACD.¹ We concluded that our patient likely reacted to SLs (a specific type of terpene joined to a lactone ring) within tulip poplar bark and wood, as supported by his patch-test results and resolution of his dermatitis with avoidance of this wood type. In addition, the SL mix used for testing consisted of equimolar amounts of alantolactone, dehydrocostus lactone, and costunolide, the latter being known to be a component of tulip poplar bark along with several other SLs.² Although we are not aware of any SLs that have been isolated from maple wood, several studies have found related compounds such as sesquiterpenes within the leaves of certain maple species.³ It is therefore possible that the positive reactions to maple wood and bark seen in our patient may have represented SL-induced cross-sensitization to similarly structured terpene compounds.⁴

Tulip poplar (*Liriodendron tulipifera*) is native to eastern North America, where it may grow to heights of 50 m and is known for its numerous pale green to yellow flowers. Other trees known to contain SLs include *Magnolia* species (within the same Magnoliaceae family as tulip poplar) and bay laurel trees (*Laurus nobilis*, native to the Mediterranean region). Finally, *Frullania* species, or liverworts, are a group of nonvascular plants that grow on bark and rocks worldwide and that have caused occupational ACD due to the presence of SLs (Fig. 1).⁴

PEARL

Although SLs are notorious for their role as allergens in Compositae dermatitis, the above case serves as a reminder that these compounds are also present in several wood species where they may induce ACD.

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Photographs are courtesy of Bernd Haynold (liverwort), DavetheMage (*magnolia*), and Giancarlo Dessi (bay laurel).

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Figure 1. Examples of several wood species and plants that are known to contain SLs. The characteristic tulip-shaped green-yellow flowers of *L. tulipifera* and the white flowers of *Magnolia grandiflora* trees are shown at the upper left and right, respectively. The foliage and flowers of *L. nobilis* are displayed at the bottom left, whereas the liverwort *Frullania dilatata* is shown at the bottom right.

Butylhydroxytoluene—From Jet Fuels to Cosmetics?

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PRECÍS

We present a case of allergic contact dermatitis from butylhydroxytoluene in a former military engineer who worked with aviation fuel during his enlistment.

DISCUSSION

A patient with a 1.5-year history of recalcitrant hand dermatitis, presented to the VA Medical Center contact dermatitis clinic.

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The dermatitis had started on both his dorsal feet and hands, spreading to affect the whole body, within 1 week of daily using Up and Up over-the-counter antifungal liquid spray containing tolnaftate 1% to self-treat presumed tinea pedis. Initially, the patient had been treated in urgent care with a prednisone taper. He promptly ceased using the spray, but his hand dermatitis persisted and worsened, despite the use of high-potency topical steroids (eg, clobetasol; Fig. 1).

When he arrived for consultation, he brought his personal hygiene products, along with the antifungal spray can. Given his history of jet fuel exposure, butylhydroxytoluene (BHT) was questioned as the causative allergen in the fungal spray. Butylhydroxytoluene was also present in his deodorant (Degree Invisible Stick) and shave gel (Nivea For Men – Sensitive). Patch testing demonstrated a 2+ reaction to BHT as well as a 1+ reaction to both the deodorant and antifungal spray. Avoidance of products containing BHT was recommended, and the patient's hand dermatitis eventually resolved.

Our patient had reported a near daily handling of F-76 and JP-5 aviation fuels, both of which can contain BHT,^{1,2} often without personal protective equipment while on active duty. Butylhydroxytoluene, or 2,6-di-*tert*-butyl-4-methylphenol, is a common antioxidant in a wide range of products from cosmetics to jet fuel (JP-4, JP-5, JP-8, Jet A, F-76).¹⁻³ Fuel samples are transported, analyzed, and used on a daily basis to keep military operations running smoothly; this transport often occurs without gloves or other personal protective equipment when performing routine checks.