

Allergic Contact Dermatitis Caused by Colophony in an Epilating Product

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Considering the widespread use of colophony-containing epilating products and the frequency of sensitization to colophony, it is somewhat surprising that reports of allergic contact dermatitis from these products are so infrequent. Reactions to colophony can be severe, and they may present even after initial exposure (primary sensitization). Consequently, health care practitioners should be aware of potential colophony-induced allergic contact dermatitis in patients exposed to epilating products. Patch testing with commercially available colophony unmodified rosins often fails to detect reactions to the modified-rosin derivatives found in the actual epilating products. Therefore, the evaluation of colophony allergy may require testing with the patient's own products as well as additional modified colophony rosins. We describe a case of allergic contact dermatitis caused by colophony found in an epilating product.

Case Report

A 28-year-old woman presented with edematous weeping pruritic plaques involving the periorbital areas. The eruption developed 24 hours after wax epilating had been performed on her eyebrows and upper lip areas. She was treated with a short course of systemic steroids, which quickly resulted in resolution of the eruption. The patient subsequently returned for patch testing with our standard screening series, selected fragrance allergens, propolis, and two commercial wax products that were used in the patient's salon. Patch testing was conducted with Finn Chambers (Epitest Ltd Oy, Tuusula, Finland) under Scanpor tape (Alpharma Norgesplaster AB, Vennesla, Norway). At the 96-hour reading, the patient was found to have a ++ reaction to colophony and both commercial wax epilating products (Figs 1 and 2). Both wax epilating products were found to contain colophony. The patient was counseled about her results, and her eruption remitted with treatment and proper allergen avoidance.

Discussion

Colophony is a natural substance obtained by distillation of oil from trees of the pine (Pinaceae) family. Colophony is used in a variety of common products such as adhesives, cosmetics, lacquers, printing ink, and insulators.

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Consequently, contact allergy to colophony is relatively common.¹ In one study of patch-test clinics in the United States, the prevalence rate for colophony allergy was found to be 4.6%.² Colophony is well recognized as a skin sensitizer and is also the third highest cause of occupational asthma.³ Because of the prevalence of colophony sensitivity in the population, this chemical is found both in the North American Contact Group standard series (Chemotechnique, Malmö, Sweden) and in the Thin-Layer Rapid Use Epicutaneous Test (T.R.U.E. Test, Mekos Laboratories A/S, Hillerød, Denmark). Unmodified colophony rosin is the screening agent currently used to detect colophony allergy; however, many drawbacks have been identified with this method.

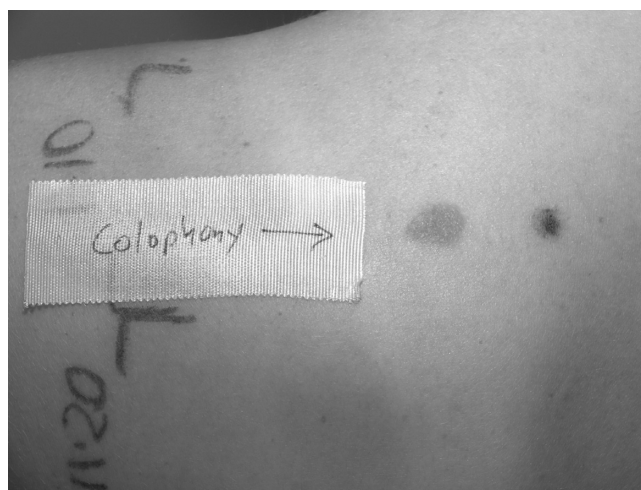


Figure 1. The patient's patch-test reaction to colophony.

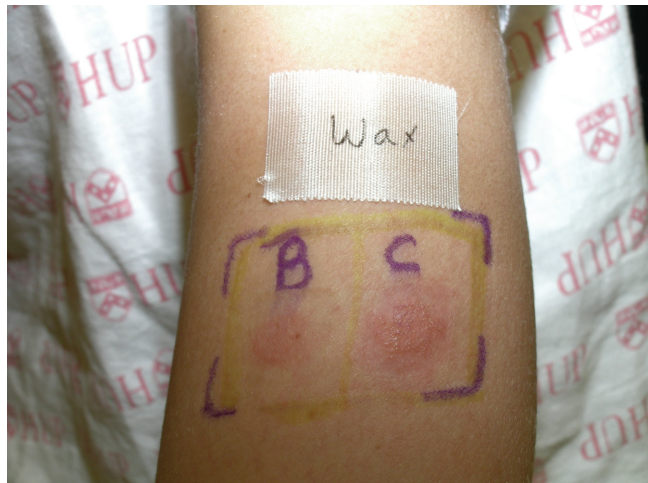


Figure 2. The patient's patch-test reactions (marked "B" and "C" on the patient's skin) to the epilating products used.

The development of sensitivity to colophony depends on the length of exposure, the concentration of the allergen, the site of exposure, skin integrity, and the chemical constituents of the rosin. Colophony may have different degrees of allergenicity, depending on its source, mode of production, storage, and handling. Additionally, patch testing with colophony is inconsistent owing to the oxidation of colophony, variable test concentrations, and the different mixtures of colophony available for testing.⁴ Further difficulty with patch testing for colophony sensitivity stems from the fact that not all of the components of colophony have been identified and that a patient may have a concomitant response to both the modified (industrially altered) and unmodified components.⁵

There are three major types of colophony, depending on whether the source of the oleoresin is gum, wood, or tall oil. Gum rosin (the most common source) is recovered from the sap of living pine trees. Wood rosin is extracted from pine stumps. Tall oil is obtained as a by-product of paper pulp production.⁶ Colophony is the residue left after the volatile oil is distilled off from the oleoresin. The final product of this process can contain hundreds of distinct chemical compounds. These constituents include 90% resin acids and 10% neutral matter. Of the resin acids, about 90% are isomeric with abietic acid; the other 10% are mixtures of dihydroabietic acid and dehydroabietic acid.

The primary component of colophony is abietic acid (sometimes called sylvic acid). Abietic acid itself is not allergenic; however, a number of compounds formed by

air oxidation of abietic acid are potent contact allergens.^{7,8} Potentially allergenic oxidation products include hydroperoxides, peroxides, epoxides, and ketones of abietic acid and dehydroabietic acid.⁹ Because allergenicity is mainly due to auto-oxidation, allergenic potential is markedly affected by handling and storage times.¹⁰ One study did demonstrate that false-negative results on patch tests were minimized by keeping the oxidation products (the main allergens) at a constant level.¹¹

Colophony is often chemically modified in order to change its technical properties for certain commercial applications. New allergens in these modified rosins do not react with chemicals in the unmodified rosins. Common modifications of colophony include the Diels-Alder reactions with dienophiles (such as maleic anhydride and fumaric acid), esterification, and hydrogenation.¹² Hausen and colleagues performed experimental sensitization studies indicating that hydrogenated rosin products have less sensitizing capacity than maleic anhydride-modified and fumaric acid-modified rosin products.^{13,14} Overall, modified products are generally the stronger sensitizers. As a result, standard patch testing with unmodified rosins fails to detect patients who are allergic only to chemicals in the modified rosins. In one study, patch testing with maleopimaric acid and glyceryl-1-monoabietate—constituents of modified rosins—picked up additional cases of allergy to colophony.¹⁵ Gäfvert and colleagues suggested several modified-rosin constituents for further testing.¹⁵ Nonetheless, if a negative result is obtained but clinical suspicion remains high, testing with the patient's actual colophony-containing product may improve the sensitivity of the testing.

To our knowledge, there have been limited reports of contact dermatitis from colophony in epilating products. The largest report examined 33 cases of acute allergic contact dermatitis from epilating waxes and/or the accompanying tissue over a 19-month period in France and Belgium.^{16,17} In this series, patch tests of 26 patients revealed strong positive reactions to the tissue (25 times) and the wax (13 times). The main causal allergens detected in this series were (1) modified colophony derivatives in the wax and (2) methoxy polyethylene glycol 22 (PEG-22)/dodecyl glycol copolymer and lauryl alcohol in the tissue. Although many patients had multiple sensitivities, primary sensitization was thought to occur in at least 10 of these patients, as 10 patients required visits to an emergency department and 12 patients needed systemic corticosteroids.

Two other case reports examined allergic contact dermatitis from colophony in depilatory wax and cold hair-removal strips. One report examined colophony-

induced occupational contact dermatitis in a beautician.¹⁸ Bonamonte and colleagues reported the case of a woman who presented with eczema on her lower extremities after using cold hair-removal strips.¹⁹ She had positive patch-test reactions to fragrance mix, *Myroxilon pereirae* (balsam of Peru), the hair-removal strip, and individual components of the hair-removal product (glyceryl hydrogenated rosinatate and glyceryl abietate 20% pet); the main allergen was presumed to be glyceryl-1-monoabietate. It is interesting that this patient reacted to both colophony and fragrance allergens. Cross-reactivity has been noted in patients who react to colophony, balsam of Peru, and fragrance mixtures, likely because all three products contain phenols.²⁰

Summary

We have presented a case of allergic contact dermatitis from colophony found in a wax epilation product. To date, such cases have been rarely reported in the literature. Colophony or one of its modified derivatives are important sensitizers in such products. It is important to note that commercially available colophony screening agents used in patch testing often fail to detect patients who are sensitized to modified colophony derivatives. Therefore, given the complex chemical composition of colophony, it is often necessary to test patients with their own products as well as with modified colophony rosins.

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