

Identification of contact allergens in colophony

by Ann-Therése Karlberg, Jan E Wahlberg, MD¹

Colophony (rosin) and its derivatives are among the most common causes of allergic contact dermatitis in man. The interest in rosin allergy has increased during the last decade. Not only the skin effects have been discussed, but also a possible role in asthma, since allergic asthma due to rosin in the fumes from soldering flux has been reported (1). An increase in the frequency of allergic reactions to gum rosin in the routine patch testing of dermatitis patients in Europe has been reported (3, 10, 12). In Sweden rosin was ranked as number four on the list of the most common causes of positive patch-test reactions among dermatitis patients tested in the dermatological clinics in 1986. Allergy to rosin is often difficult to explain by reviewing the patient's history, since it is present in so many different products used both at work and during spare time (eg, in paper, printing inks, soldering fluxes, cutting fluids, paints, glues, varnishes, surface coatings, insulation tapes, cleansing agents, adhesive tapes, periodontal dressings, cosmetics, brown soaps, chewing gum). However, the importance of contact with rosin at work has been demonstrated. (See figure 1 and reference 8.)

Recovery

Rosin is obtained mainly from various *Pinus* species, and global production approaches one million tons a year. Three major types of rosin are produced, depending on the type of recovery. Gum rosin is tapped from living trees, wood rosin is extracted from pine stumps or pine wood, and tall oil rosin is obtained as a by-product in paper pulp production. More than half of the total world production of rosin consists of gum rosin, but the production of tall oil rosin is increasing. Gum rosin is not produced in Scandinavia, but Sweden and Finland are important producers of tall oil rosin. Rosin has a complex chemical composition which differs depending on factors such as species, growth locality, recovery process, and handling storage. It is composed of about 90 % acidic material and 10 % neutral substances. For many purposes rosin can be used regardless of the source, despite the difference in composition. In most cases it is used in modified forms (2).

Contact allergy to rosin from different sources

When patients with suspected allergic contact dermatitis are patch-tested, it is desirable to use chemically defined allergens. However, gum rosin is used in the standard tray as a screening material for contact allergy, since the chemical composition of rosin is very complex. The allergenicity of different gum rosins agrees well, while tall oil rosin shows less reactivity when various rosins are tested simultaneously in consecutive dermatitis patients with suspected allergic contact dermatitis (6, 8, 9).

Allergens in gum rosin

Abietic acid (figure 2 a) is the main component of rosin, and it is also considered to be the classical allergen (3). Positive patch-test reactions to abietic acid have been described in many case reports (3, 11), but, in animal experiments and clinical testing, we have recently demonstrated that pure abietic acid is not allergenic (4).

We have isolated and identified some of the allergens in Portuguese gum rosin. Fractionation was performed by the use of chromatographic methods (5 and unpublished results of Karlberg et al). The isolated fractions were tested for contact allergenicity in guinea pigs sensitized to gum rosin according to conventional

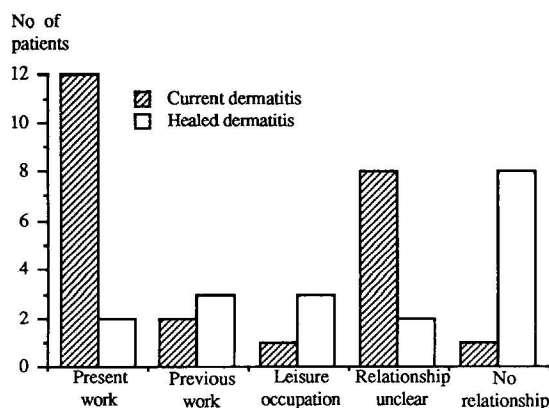


Figure 1. Anamnestic relationship between dermatitis and exposure to rosin in work and leisure-time activities. Forty-two patients with active and healed lesions at the time of the study were compared. Many patients with multiple allergies were found in the group with an unclear relationship between dermatitis and exposure to rosin.

¹ Division of Occupational Dermatology, National Institute of Occupational Health, Solna, Sweden.

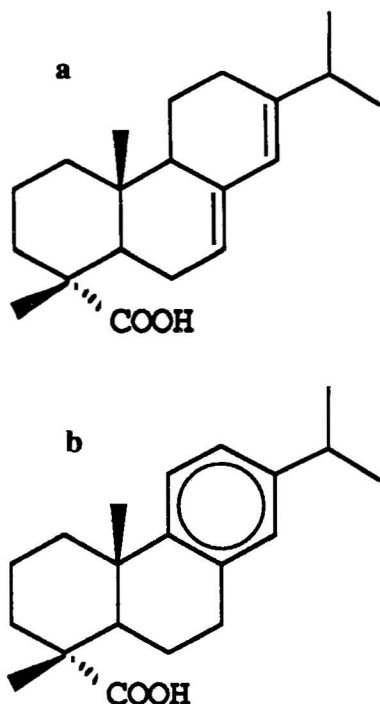


Figure 2. Abietic acid (a) and dehydroabietic acid (b).

methods. The studies concentrated on the fractions with the highest eliciting activity. Oxidation products of abietic acid and dehydroabietic acid (figure 2 b) were identified as contact allergens. The compounds showed a pattern of cross-reactivity in animal experiments as well as in patients. Dehydroabietic acid is more stable towards oxidation than abietic acid. The allergenicity of gum rosin was markedly reduced when

the compounds containing nonaromatic double bonds, ie, acids of the abietic type, were eliminated by hydrogenation (7).

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