

Sandarac resin

Sandarac resin is collected from trees that belong to the *Cupressaceae* subfamily of the Coniferae family (African sandarac is obtained from the species of *Tetraclinis articulata*, Australian sandarac comes from species of *Callitris*) [1-3]. The colour of sandarac resin can vary from pale yellow to orange. [1, 3, 4]

The main component in sandarac resin is communic acid (about 70%) in polymerised form. Therefore, the resin is harder compared to some other terpenoid resins. In addition to the polymeric fraction, sandarac resin also contains sandaracopimaric acid and its derivatives and some phenolic compounds, such as totarol and ferruginol (see Fig. 1). The level of polymerisation and oxidation increases with time, simultaneously the solubility of the resin decreases. [2-6]

Sandarac resin has been used since ancient times and its main use is for the production of varnish (oil- and spirit-based) for paintings. It has also been used as a coating material for leather, stone, and metal objects and in calligraphy [1, 2, 7]. For the preparation of oil varnish, sandarac resin is first pulverised and then mixed with hot linseed oil [3, 4, 7]. Sandarac oil varnish leaves a glossy and hard layer that is fairly difficult to remove from the surface of the object because of the mainly polymeric composition of the resin. The heat treatment also leads to fragmentation and decarboxylation of polycommunic acid and this, in turn, has an effect on the stability, solubility, and the colour of the varnish. Similar problems also exist with the spirit-based sandarac varnish, but to a lesser extent because of the missing heat-treatment stage [3]. At the same time, the varnish layer of the spirit varnish is not as elastic as the one left by the oil varnish and it becomes more brittle with time [1, 3].

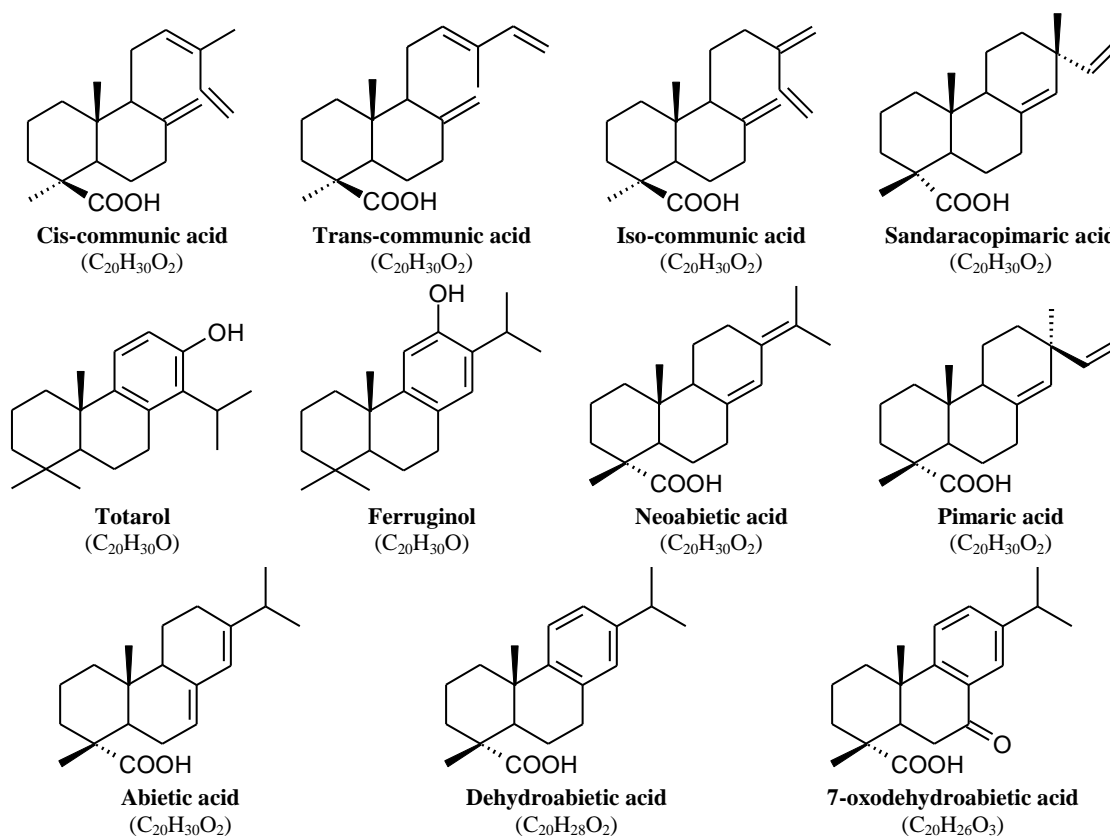


Fig. 1. Selection of components present in sandarac and colophony resins [3].

Colophony resin

Colophony resin (also known as rosin) is one of the by-products of the resinous material obtained from pine trees (*Pinus* subfamily), turpentine being the other. It is a soft resin with yellow to brown colour that dissolves in different alcohols, turpentine, etc. [3, 4].

The main component in fresh colophony resin is abietic acid which readily oxidises with time to give dehydroabietic acid, and this, in turn, oxidises to 7-oxodehydroabietic acid. Colophony resin also contains other diterpenoids, such as neoabietic acid, pimaric acid, etc. [4, 5, 8]. The structures of these compounds can be found in Fig. 1.

The main drawbacks of colophony resin, and thus the varnish (mainly oil-based) produced from this resin are related to the resins' acidic composition: it is damaging to basic materials, such as some pigments, linen canvas, etc., its rapid oxidation leads to the darkening of the resin. Nevertheless, colophony resin has been used as a varnish component, especially in Europe as a cheap alternative for more expensive resins, such as mastic and sandarac [3, 5].

In addition to varnish production, colophony resin has been used in various other applications: in the naval industry as a waterproofing agent, as an additive in paper, oil and tempera medium, and more recently as a component in synthetic rubber, printing ink, and chewing gum, etc. [1, 9].

References

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