

The Infrared Absorption of Rosin Acids in Tall Oil Rosin

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The tall oil rosin produced in Northern Europe is composed of 90–95 % rosin acids, 5–10 % fatty acids and 0.3–2 % unsaponifiables^{1,2}. Sandermann³ studied the rosin acid fraction of tall oil rosin using chemical methods and found it to contain about 50 % abietic acid, up to 25 % dextropimaric acid, and up to 25 % pyroabietic acids which represent a mixture of dehydro-, dihydro- and tetrahydroabietic acids⁴. Later spectrophotometric studies^{5,6} of the rosin acids of tall oil rosin have shown the abietic acid content to vary from 23 to 52 % and that of dehydroabietic acid⁵ from 30 to 45 %.

The present paper deals with an investigation of the infrared absorption of two samples of the rosin acid fraction of tall oil rosin. The purpose of the study was to utilize previously recorded infrared absorption spectra for individual rosin acids^{7,8} to obtain information about the composition of the rosin acid fraction in tall oil rosin. The isolation of the rosin acids from tall oil rosin which was a crystalline, batch-distilled quality (a commercial product of Enso-Gutzeit Oy, Kotka, Finland) was in one case performed using the customary method of extracting the esterified fatty acids and unsaponifiables and in the other by precipitating the rosin acids with *cyclohexylamine* from the solution of tall oil rosin in acetone⁹. Both rosin acid fractions were recrystallized from methanol and acetone.

The infrared absorption curves recorded for the two samples are reproduced in Figs. 1 and 2, respectively. The curves are seen to be identical. All the bands in one can be distinguished in the other and corresponding bands are almost equal in height. (Absorption curves similar to these were also recorded for rosin acid samples isolated by *cyclohexylamine* preci-

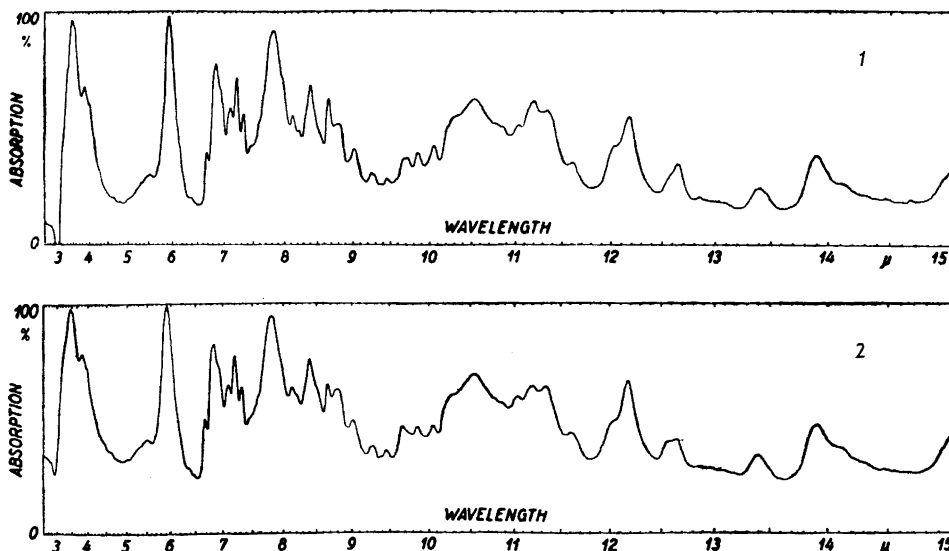


Fig. 1 and Fig. 2. Infrared absorption spectra of the rosin acid fraction of tall oil rosin: 1) Rosin acid fraction isolated from tall oil rosin by removing esterified fatty acids and unsaponifiables by solvent extraction. 2) Fraction isolated by precipitating the rosin acids with *cyclohexylamine*.

precipitation from amorphous tall oil rosin (also a product of the above-mentioned company) and from a crystalline, continuously distilled product of Oulu Oy, Oulu). Bands typical of abietic acid occur at 8.66, 11.21, 12.65 and 13.87 μ and bands typical of dehydroabietic acid at 6.68, 8.82, 9.65, 12.20 and 13.89 μ . No bands are observed which would indicate the presence of tetrahydroabietic acid (characteristic bands at 8.47, 8.61 and 14.27 μ), dihydroabietic acid (bands at 11.53 + 11.68 and 14.12 μ ; the shoulder at 14.12 μ results from the combined medium strong absorptions of abietic and dehydroabietic acids), dextropimaric acid (bands at 6.97, 11.75, 14.00 and 14.61 μ), and *isodextropimaric acid* (bands at 8.00, 8.68 + 8.75, 11.00, 13.67 and 13.99 μ). The rosin acid mixture isolated from tall oil rosin thus seems to consist solely of abietic and dehydroabietic acids. No signs indicating the presence of other acids of the abietic series or of pimaric acids are evident (if these do exist in the mixture, their contents amount to a few per cent at the most).

Absorption spectra * recorded for binary mixtures of abietic and dehydroabietic acid suggested that the batch-distilled rosin acid samples studied contained about 55 % abietic acid and about 45 % dehydroabietic acid.

Absorption spectra * recorded for rosin acid mixtures isolated by *cyclohexylamine* precipitation from crystalline tall oil rosin samples which were heated at 300°C for periods of different length revealed that the content of dehydroabietic acid in the mixtures increased with the time of heating. The rosin acid mixture precipitated with *cyclohexylamine* from a tall oil rosin sample that had been heated three hours at 300°C was found to consist almost solely of dehydroabietic acid. A similar observation concerning American tall oil rosin has been previously reported by Hasselström ¹⁰.

The observation that the rosin acid mixture isolated from tall oil rosin does not contain pimaric acids is somewhat surprising and does not conform with the analytical data of Sandermann or with the general opinion of the composition of the rosin acid fraction of tall oil rosin. However, the somewhat erroneous conclusions that were drawn on the basis of the very extensive

work that was done after the turn of the century to determine the structure of pinabietic acid is now easily understood when one realizes that this rosin acid mixture primarily consisted of only two abietic acids.

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Association of Crystallized Bovine Plasma Albumin

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Many investigators have found that the molecular weight of bovine plasma albumin (B.P.A.) is about 70×10^5 . This figure has been obtained from osmotic measurements (see, e. g., Scatchard

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