

SOME FLAVANONES AND FLAVANONOLS OF
THE HEARTWOOD OF *Larix dahurica*

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At the present time, the compositions of the phenols of the heartwoods of many species of the genus *Larix* have been investigated and it has been shown that characteristic components of it are two flavanols — dihydroquercetin and dihydrokaempferol [1]. In very rare cases, other flavonoids have been found in addition to these compounds: quercetin in *L. laricina* K. Koch [2], kaempferol and quercetin in *L. dahurica* Tourcz. [3], and, assumedly, naringenin in *L. leptolepis* Gord. [4].

Continuing a study of an acetone extract of the heartwood of the Dahurian larch, from which dihydroquercetin, dihydrokaempferol, quercetin, and kaempferol have previously been extracted preparatively [3], we have found another four flavonoids. The minor flavonoid components of interest to us were reextracted with a mixture of petroleum ether and diethyl ether (7:3) from an acetone extract previously treated with petroleum ether. After additional chromatography on polyamide powder (eluent: chloroform and chloroform-methanol), three fractions enriched with these compounds were obtained. Comparison with authentic samples and by chromatography on Silufol in the chloroform-diethyl ether (95:5) and benzene-ethyl acetate (9:1) systems, led to the preliminary identification of the flavanones pinostrobin, pinocembrin, and naringenin, and the flavanonol pinobanksin.

To analyze these compounds we used the gas-liquid chromatography of their TMS ethers [5]. The relative retention times (RRTs) of the silylated components of the fractions investigated agreed well with the RRTs of the TMS ethers of authentic samples: pinocembrin (1.0), pinobanksin (1.19), and naringenin (1.97). The retention time of the pinocembrin TMS ether taken as standard was 7 min. The TMS ether of pinostrobin gave two peaks on the chromatogram, which complicated its identification by the GLC method.

The substances were analyzed on a Tsvet-4 chromatograph with a flame-ionization detector using helium as the carrier gas (1.1 atm gauge) and a stainless steel column (300 × 0.3 cm). The stationary phase was 5% of SE-30 on Chromaton N-AW-HMDS, and the temperature of the column was 272°C and that of the evaporator, 300°C.

Taking these additional facts into account shows still more clearly the great generality in the composition of the phenolic components of the heartwoods of the two genera *Larix* and *Pseudotsuga*, family Pinaceae. It is known that the heartwood of *P. menziesii* Franco contains, in addition to a large amount of dihydroquercetin, smaller amounts of dihydrokaempferol, quercetin, pinobanksin, and pinocembrin [6, 7].

It is interesting to note that botanically these genera are assigned to different subfamilies. The genus *Pseudotsuga* differs considerably in its chemical composition from other genera of its subfamily Abietoideae and in this respect has greater analogy with the subfamily Laricoideae, to which the genus *Larix* belongs.

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