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TRITERPENE ALCOHOLS FROM THE LEAVES OF *Populus tremula*

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In recent years, a tendency has been observed to the use for chemical processing not only of the woody verdure of the pine and the larch but also, in particular, that of the aspen. The composition of the extractive substances of the leaves and shoots has been studied inadequately in comparison with the extractive substances of the trunk part of the tree.

The petroleum-ether-soluble fraction (6.3% of the weight of the dry leaves) of an ethanolic extract was separated into neutral substances (49.5%), free acids, and waxes. The chromatography of the neutral substances on a column of silica gel led to the isolation of an ester fraction (9.85 g; 32.4%, here and below on the neutral substances; IR spectrum: 1730 cm^{-1}). After saponification of the fraction with 0.5 N KOH in ethanol and the usual working-up procedure, the bound acids and the unsaponifiable substances (3.58 g, 11.65%) were obtained. From the unsaponifiable substances, on a column of silica gel, a fraction (1.68 g) was isolated that contained mainly 4,4-dimethylsterols. After acetylation of the fraction with acetic anhydride in pyridine and the appropriate working-up procedures, the acetates of triterpene alcohols (0.35 g) were separated by chromatography on silica gel with the addition of 5% of silver nitrate (with elution by petroleum ether containing 5% of diethyl ether) from the accompanying components (acetates of aliphatic alcohols, phytol, and prenols).

The chromato-mass spectrometry of the triterpene alcohol fraction in a glass capillary column containing OV-17 showed the presence of six components in the fraction. The mass spectra of four of the compounds were identical with the mass spectra of β - and α -amyryns, cycloartenol, and lupeol [1, 2]. The main component of the fraction, with M^+ 468 (10%), 453 (53), 408 (2), 393 (57), 297 (4), 255 (7), 241 (8), 229 (8), and 69 (100), was not identified from its mass spectrum.

The residue of the fraction (0.34 g) was chromatographed on a column of silica gel with the addition of 30% of silver nitrate. Petroleum ether with the addition of 3-5% of diethyl ether eluted successively the combined acetates of α - and β -amyryns (35 mg; identified by chromato-mass spectrometry); the acetate of the main component of the fraction (158 mg); cycloartenol acetate (50 mg, mp 129-130°C; PMR); and lupeol acetate (53 mg; mp 215-217°C; mass spectrum; PMR).

The main component of the fraction (mp 147-148°C from hexane) was identified from its spectra (PMR, IR, mass spectrum) as butyrospermol acetate (5 α -eupha-7,24-diene 3 β -acetate). According to the literature [3]: mp 146-147°C. To confirm its structure, the compound isolated was treated in chloroform with hydrochloric acid, and the compound obtained was identified by its PMR and mass spectra as 5 α -eupha-8,24-diene 3 β -acetate (euphol acetate) [4].

Thus, it has been shown that in the leaves of the aspen *Populus tremula* five types of triterpenoids are synthesized - oleanolanic, ursanic, lupanic, lanostanic, and euphanic.

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