STRUCTURE OF SCABIOSIDE F

V. G. Bukharov and V. V. Karlin

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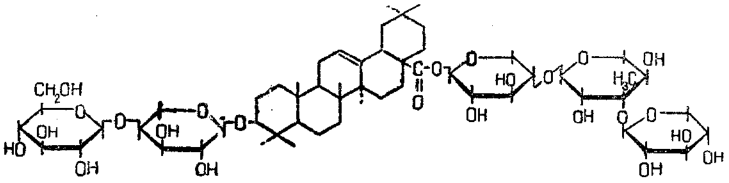
Scabioside F, a triterpene glycoside with mp 232–235° C, $[\alpha]_D^{20}$ −21° (c 5.2, pyridine), was isolated from Patrinia scabiosofolia Fisch, et Link [1]. On acid hydrolysis it decomposes into oleanolic acid, D-glucose, L-arabinose, D-xylose, and L-rhamnose. According to its molecular weight (1160) scabioside F is a pentaoside. On alkaline hydrolysis on an anion-exchange resin [2], scabioside F is converted into scabioside B, i.e., into oleanolic acid 3-O-β-D-glucopyranosyl-(1 → 4)-α-L-arabinopyranoside

Exhaustive methylation of scabioside F and subsequent cleavage of the resulting permethylate with HCl gave 2,3,4,6-tetra-O-methyl-D-glucopyranose, 2,3-di-O-methyl-L-arabinopyranose, 2,3-di-O-methyl-D-xylopyranose, and a dimethyl-L-rhamnose. Of the three possible dimethyl-L-rhamnose derivatives (2,3-, 2,4-, or 3,4-di-O-methyl) we chose 2,4-di-O-methyl-L-rhamnopyranose. The correctness of this choice is confirmed by the results of the periodate oxidation of scabioside F, in which all the monosaccharide residues with the exception of the L-rhamnose are destroyed.

Reductive cleavage of the permethylate of scabioside F using lithium aluminum hydride gave a methylated trisaccharide which decomposed on acid hydrolysis into 2,3,4-tri-O-methyl-D-xylopyranose, 2,4-di-O-methyl-L-rhamnopyranose, and 2,3-di-O-methyl-D-xylitol.

Consequently, one xylose is attached directly to the carboxyl of oleanolic acid and the other is present in a trisaccharide chain in which, as is shown by calculations based on the difference in the molecular rotations between scabiosides E [1] and F, the terminal xylose has a β-bond. The complete coincidence of the configurations of the analogous glycoside centers of the two scabiosides is also confirmed by the results of calculations by Klyne's method. Thus scabioside E is a genetic precursor of scabioside F. On the basis of the above, scabioside F must be ascribed the following structural formula



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Arbuzov Institute of Organic and Physical Chemistry, AS USSR