AN INVESTIGATION OF THE GLYCOSIDES OF JUTE

IV. EVONOSIDE

V. A. Maslennikova, R. U. Umarova,
and N. K. Abubakirov

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In the chromatographic separation of an ethanolic extract of the seeds of Chorchorus olitorius L. (jute) on alumina in the butan-1-ol–toluene–water (1 : 1 : 1) system, in addition to corchoroside, olitoriside [1], erisimin, and erisimoside [2], isolated previously, we obtained a small amount (about 0.005%) of a glycoside with mp 204;206°C, $[\alpha]_D^{20} -24.3° \pm 2°$ (c 2.059; methanol). The UV spectrum $\lambda_{max}^{C_2H_5OH}$ 218 nm, log ε 4.18) and the IR spectrum ν_{max}^{KBr} 3400, 1725, 1640, 1055, 1080 cm^{-1}) corresponded to those for cardenolides. With 84% H_2SO_4, the substance formed a coloration changing with time: 0 min – orange; 10 min – lilac; 1 h – dirty-violet.

Found: mol.wt. 828 (spectrophotometrically in comparison with digitoxigenin at $\lambda_{max}^{C_2H_5OH}$ 218 nm). $C_{41}H_{64}O_{18}$. Calculated: mol.wt. 844.96.

The glycoside was not hydrolyzed by 0.1 N H_2SO_4 and did not give a characteristic red coloration with xanthydrol and, consequently, does not contain 2-deoxy sugars.

On hydrolysis according to Mannich [3], the hydrolysate was found to contain L-rhamnose and D-glucose. The sugars were identified chromatographically in the butan-1-ol–acetic acid–water (4 : 1 : 5) and butan-1-ol–methyl ethyl ketone–borate buffer (1 : 1 : 2) systems. The presence of the same sugars was confirmed by the GLC of the trimethylsilyl derivatives of the methyl glycosides of the corresponding sugars [4].

By preparative separation on a fixed layer of silica gel in the chloroform – 10% methanol system, from the aglycone fraction of the hydrolysate we isolated four chromatographically individual compounds, which we have denoted by A, B, C, and D. Substances A and B proved to be glycosides. The more polar of them, substance A, had mp 190-193°C; on rehydrolysis by Mannich's method, L-rhamnose and D-glucose were found. Substance B was not investigated, because of the small amount available. Substance C had mp 247-250°C, and on the basis of its mass spectrum (M^+ 374; m/e 356, 338, 323, 246, 203) [5] and also by a direct comparison using PC in the chloroform–dioxane/methanol (7 : 2 : 0.5)/formamide system and TLC on a fixed layer of silica gel in the chloroform – 10% methanol and chloroform – benzene – methanol (5 : 5 : 2) systems it was identified as digitoxigenin. Substance D, with mp 188-192°C was probably, from its mass spectrum (M^+ 356; m/e 338, 323, 246, 213) and its chromatographic behavior, a mixture of α- and β-anhydrodigitoxigenins.

The facts given permit the conclusion that the cardenolide that we isolated is evonoside, which has the structure of digitoxigenin-L-rhamnose-D-glucose-D-glucose. This glycoside has been found previously in Evonimus europae L. [6].

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