SMILAGENIN FROM Polygonatum polyanthemum

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It is known from the literature that the genus Polygonatum family Liliaceae contains steroid saponins and the rhizomes of P. polyanthemum (M.B.) Die and P. multiflorum (L.) All contain tigogenin (by thin-layer chromatography) [1, 2].

We have studied the rhizomes of P. polyanthemum (M.B.) Die, collected in the Kuba region of the Azerbaidzhan SSR. The comminuted raw material was extracted with methanol to exhaustion. The concentrated methanolic extract was purified until the pure saponins were formed. The chromatography of the saponins obtained in a thin layer of silica gel in the systems 1) butan-1-ol saturated with water; 2) butan-1-ol–ethanol–water (1 : 1 : 1); and, 3) butan-1-ol–acetic acid–water (4 : 1 : 5) showed the presence of one glycoside of steroid nature [3] with R_f 0.59, 0.57, and 0.62, respectively.

The purified saponin was hydrolyzed with 2 N sulfuric acid at 80°C for 6 h. The sapogenin after crystallization from ethanol had mp 184-185°C, $[\alpha]_D^{20}$ −62.3° (c 0.8; pyridine). The IR spectrum of the genin exhibited absorption bands characteristic of steroid sapogenins of the iso series (845, 900 > 925, 987 cm^{-1}) [4] and of an OH group (3200-3500 cm^{-1}).

Acetylation of the sapogenin with acetic anhydride in pyridine gave the acetate with mp 145-147°C. A comparison of the physicochemical properties and IR spectrum of the sapogenin isolated with literature data [1, 5] may indicate that the latter is smilagenin.

A hydrolysate of the glycoside was found by paper chromatography in system 3 to contain three sugars: glucose, arabinose, and rhamnose.

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