GLAUCINE-CONTAINING PLANTS OF THE GENUS Glaucium

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The alkaloid glaucine, which is used as an antitussive agent and is obtained from plants of the genus Glaucium, family Papaveraceae, has previously been detected only in G. flavum, G. serpieri, and G. elegans [1-3]. We have found that glaucine is also present in the epigeal part of G. grandiflorum, the alkaloid composition of which has not previously been studied.

The herbage and roots of this plant collected in Armenia in the environs of the village of Khachik in 1971-1972 in the flowering period were investigated. From the epigeal part 0.6% of combined alkaloids was obtained by the dichloroethane method, and the separation of these on alumina gave glaucine, O-methylatheroline, glauvine, protopine, isoboldine, and a base with mp 191-192°C (from ethanol), glaucine making up about 50% of the combined weight of the alkaloids. The first five alkaloids were identified by direct comparison with authentic samples. The alkaloid with mp 191-192°C had the composition $C_{20}H_{23}NO_4$, $[\alpha]_D^{18}+40°$ (c 1; chloroform). UV spectrum: λ_{max} 220, 280, 305 nm (log ε 4.58, 4.14, 4.18). IR spectrum: 3250-3350 cm^{-1}. The NMR spectrum of the base (HA-100, $CDCl_3$, HMDS) showed a three-proton singlet of N-CH_3 at 2.47 ppm, three three-proton singlets of OCH_3 groups at 3.78, 3.82, and 3.83 ppm, three singlets of aromatic protons (6.44 ppm - C_3H; 6.69 ppm - C_8H; 7.98 ppm - $C_{11}H$), a diffuse signal of a hydroxyl proton at 6.37 ppm, and also multiplets of CH_2 groups in the 2.4-2.7 and 2.8-3.1 ppm regions.

By comparing the results obtained with literature information, this compound was identified as thalicmidine, an alkaloid which is characteristic for plants of the genus Thalictrum and is also found in G. flavum var. vestitum) [4-6].

From the roots of G. grandiflorum we isolated 0.82% of combined alkaloids, from which sanguinarine, protopine, and isoboldine were obtained and identified.

It is interesting to note that all the hornpoppy species G. flavum, G. serpieri, and G. grandiflorum containing glaucine are characterized by different amounts of combined alkaloids and of glaucine in the epigeal part of the plant. The amounts of combined alkaloids and of glaucine in the flowering phase are, respectively, 3.33 and 1.79% for G. flavum, 3.63 and 1.73% for G. serpieri, and 0.60 and 0.27% for G. grandiflorum. All the species have very similar alkaloid compositions. As an example we may mention the amount of oxidized aporphine alkaloids in the herbage of the species referred to. We have previously reported the isolation from the herbage of G. flavum of O-methylatheroline and glauvine [7]. A study of G. grandiflorum and G. serpieri enabled us to show for the first time that these species also contain O-methylatheroline and glauvine and are apparently characterized by similar biochemical processes of the transformations of the aporphine systems.

LITERATURE CITED

1. L. D. Yakhontova, Lekarstv. Rast., 15, 348 (1969).
2. R. Manske, Canad. J. Res., 20, 53 (1942).
3. L. Slavikova, Collection Czech. Chem. Commun., 33, No. 2, 635 (1968).
4. S. Yu. Yunusov and N. N. Progressov, Zh. Obshch. Khim., 20, 1151 (1950).
5. Kh. G. Pulatova, Z. F. Ismailov, and S. Yu. Yunusov, Khim. Prirodn. Soedin., 67 (1967).
6. I. Ribas, J. Sueiras, and L. Castedo, Tetrahedron Lett., 20, 2033 (1972).
7. L. D. Yakhontova, V. I. Sheichenko, and O. N. Tolkachev, Khim. Prirodn. Soedin., 214 (1972).

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