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ALKALOIDS OF *Glaucium corniculatum* AND *G. flavum* GROWING IN GEORGIA

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Species of the *Glaucium* genus (Papaveraceae) typically have a high content of the biologically active aporphin alkaloid glaucin, which is used as a cough medicine [1, 2].

We studied in detail the chemisty of *Glaucium corniculatum* Curtz. and *G. flavum* Grantz. growing in Georgia. Both plants were collected during flowering, *G. corniculatum* in 1996 in Meskhetiya (Adigeni region) and *G. flavum* in 1996-1998 near Kobuleti. The total alkaloid content was 0.46 and 1.5%, respectively.

The above-ground parts of both species were extracted with $CHCl_3$. Treatment of the concentrated extracts with 5% H_2SO_4 isolated a crystalline fraction of alkaloid sulfates [3]. The precipitated alkaloid sulfates were separated, dissolved in water, basicified with 25% NH_4OH, and extracted with $CHCl_3$. Concentration of the extract from *G. corniculatum* produced a precipitate, treatment of which with methanol isolated crystals with mp 105-108°C (diethylether), $[\alpha]_D^{20}$ +116° (*c* 0.75, methanol). The base was identified as glaucine, the yield of which was 0.09% of the starting mass [4, 5].

The $CHCl_3$ extract of *G. flavum* was concentrated and separated on an aluminum oxide column (1:60, neutral, activity II) after converting the sulfates to the base.

The alkaloids were eluted by benzene and benzene—methanol. Elution by benzene produced sanguinarine; by benzene—methanol (99:1), chelerythrine and glaucine. The content of the latter was 0.83% of the starting mass [6].

The remaining acidic mother liquor from both plants after removal of the sulfates was basicified with NH_4OH (25%) and extracted with $CHCl_3$. The alkaloids were divided into phenolic and nonphenolic parts [3]. The phenolic bases of *G. corniculatum* were placed on a silica-gel column (1:70). The column was eluted with $CHCl_3$, $CHCl_3$—CH_3OH, and CH_3OH. Elution with $CHCl_3$ produced isocorydine and corydine; with $CHCl_3$—CH_3OH (90:10), thalicmidine [4, 5].

Treatment of the nonphenolic fraction with CH_3OH and grinding produced a mixture of crystals, from which fractional crystallization in CH_3OH—$CHCl_3$ isolated protopine and α-allocryptopine [5].

Concentration of the $CHCl_3$ solution of nonphenolic bases from *G. flavum* produced a dark violet precipitate, treatment of which with CH_3OH isolated dark green crystals with mp 210-212°C (methanol). The base was identified as corunine [6].

The mother liquor after removal of corunine was concentrated and treated with 10% H_2SO_4. The acidic extracts were basicified to pH 9-10 with cooling. The alkaloids were extracted into $CHCl_3$. The $CHCl_3$ extracts were concentrated and treated with CH_3OH with grinding to give a mixture of crystals, from which fractional crystallization in CH_3OH—$CHCl_3$ isolated protopine and α-allocryptopine [7-9].

Separation of the phenolic fraction on a silica-gel column (1:70) with elution by $CHCl_3$ produced isocorydine and corydine; by $CHCl_3$—CH_3OH (98:2), isoboldine [7].

Thus, the principal alkaloid in *G. corniculatum* and *G. flavum* growing in Georgia is the pharmacologically active base glaucine. Corydine, isocorydine, protopine, and α-allocryptopine are found in both species. In addition, isoboldine, corunine, sanguinarine, and chelerythrine are isolated from *G. flavum*; talicmidine, from *G. corniculatum*.

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