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ALKALOIDS OF *Glaucium flavium*

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Glaucium flavum Grantze, var. *fulvum* (Sm) Fedde is a perennial herbaceous plant of the *Papaveraceae* family. It has been introduced into cultivation in the Northern Caucasus on the basis of the botanical garden of the Pyatigorsk Pharmaceutical Institute and the outstation of the Komarov Botanical Institute of the Academy of Sciences of the Russian Federation at Pyatigorsk. Under cultivation conditions, the plant has shown a high productivity (more than 30 tonnes/ha of air-dry raw material and 1 tonne/ha of seeds) [1]. To study its alkaloid composition we have used the epigeal part of the cultivated plant gathered in the flowering period during June 1990.

The chloroform extraction of a sample of raw material (680 g) yielded 20.26 g of total alkaloids (2.98% on the weight of the air-dry raw material), which was divided into phenolic and nonphenolic fractions. Isoboldine (1.2 g) was obtained by fractional crystallization from the phenolic fraction, and protopine (1.2 g) from the nonphenolic fraction. After the removal of the crystals, the phenolic fraction was chromatographed on a column of silica gel with elution by chloroform and by mixtures of chloroform and ethanol in various ratios. As a result of fractionation, the following alkaloids were isolated: isocorydine (2.5 g), thalicmidine (0.5 g), isoboldine (2.8 g), and N-methyllaurotetanine (0.05 g).

A study of the nonphenolic fraction of the total alkaloids showed the presence in it of adlumidine (0.5 g), isocorydine (1.4 g), glaucine (6.0 g), thalicmidine (0.07 g), protopine (0.1 g), and reticuline (0.12 g).

Isocorydine — mp 182-184°C (from acetone), $[\alpha]_D$ +181° (*c* 2.27; chloroform) [2]. $M^{+\cdot}$ 341. UV spectrum: λ_{max} 208, 253, 300 nm (lgε 4.27; 4.02; 3.66). PMR spectrum: 2.53 (3H, s, N−CH); 3.70 (3H, s, OCH_3); 3.90 (6H, s, 2 × OCH_3); 6.70 (1H, s, Ar−H) and 6.82 (2H, s, 2 × Ar−H); 8.90 ppm (1H, br.s, OH) [4].

Reticuline — oil, $[\alpha]_D$ +47.1° (*c* 0.32; methanol). $M^{+\cdot}$ 329. UV spectrum: λ_{max} 286 nm (lgε 4.10). PMR spectrum: 2.40 (3H, s, N−CH_3); 3.77 (6H, s, 2 × OCH_3); 6.23; 6.52 (each 1H, s); 6.64 ppm, 6.64-6.77 (3H, m) [3].

N-Methyllaurottetanine — amorphous, $[\alpha]_D$ +88° (*c* 0.64; chloroform) [5]. $M^{+\cdot}$ 341. UV spectrum λ_{max} 215, 283, 305 nm (lgε 4.52; 4.17; 4.08) [4]. PMR spectrum: 243 (3H, s, N−CH_3); 3.56 (3H, s, OCH_3); 3.78 (6H, s, 2 × OCH_3); 6.50 (1H, s); 6.65, 7.97 (each 1H, s); 5.45 ppm (1H, m, OH) [4,5].

The alkaloids thalicmidine, adlumidine, protopine, glaucine, and isoboldine were identified from their melting points and $[\alpha]_D$ values, and also by direct TLC comparison with authentic samples and from the absence of depression of the melting point of a mixture of the base isolated with a "marker" alkaloid.

Thus, from specimens of *G. flavum* var. *fulvum* cultivated in the Northern Caucasus we have isolated eight alkaloids, the main ons of which are glaucine, isoboldine, and isocorydine.

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