

**CHEMICAL STUDY OF THE EPIGEAL PARTS
OF THE PLANTS *Ammothamnus lehmannii*
AND *Cicer mogoltavicum***

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UDC 547.972

From the roots of the plant *Ammothamnus lehmannii* Bge gathered close to the village of Kochka, Kenimekh region, Navoi province, Republic of Uzbekistan, we have already isolated two new flavonoids — ammothamnidin and lehmannin —, and from the epigeal part luteolin, cynaroside, quercetin, and isoquercetin, and from the roots of the plant *Cicer mogoltavicum* A. Kor gathered in the mountains of Kara-Tau, Dzhabul province, Republic of Kazakhstan, the isoflavonoids biochanin-A, formononetin, protensin, ononin, and trifolirhizin [1-3].

Continuing the investigations, from the chloroform fraction of an alcoholic extract of the epigeal part of *A. lehmannii* gathered during the flowering period in the environs of Lake Shukul', Dzhabul province, Republic of Kazakhstan, by column chromatography on silica gel chloroform-hexane elution we have isolated fractions containing two flavonoids. The rechromatography of these fractions on polyamide with elution by chloroform-hexane (3:1) led to substance (1) and with chloroform-hexane (8:2) and (9:1) to fractions containing a single flavonoid. These fractions were purified by rechromatography on a column of polyamide, and elution with chloroform-methanol (9:1) yielded substance (2).

Substance (1), with mp 112-114°C (from acetone-hexane), R_f 0.58 (Silufol-254, acetone-hexane (1:1)) was identified as ammothamnidin by comparison with an authentic specimen [3].

Substance (2), with mp 102-104°C, λ_{\max} (ethanol) 240, 286, 315 nm ($\log \epsilon$ 4.05, 4.07, 3.82), was a flavonone. This fact was also shown by the signals of the H-2 and 2H-3 protons of the heterocyclic ring of the flavone nucleus, appearing in the PMR spectrum (Py-d₅) at 6.15 ppm (1H, dd, $J = 11.0$ and 5.0 Hz, H-2) and 2.87-3.26 ppm (5H, m, 2H-3, H-1", H-2"). On the basis of its UV, IR, and PMR spectra, and also by a direct comparison with an authentic sample, substance (2) was identified as lehmannin [4].

The chloroform fraction of an alcoholic extract of the epigeal part of *Cicer mogoltavicum* gathered in the neighborhood of Angren, Tashkent province, Republic of Uzbekistan, was chromatographed on a column of silica gel in a chloroform-hexane gradient system. Elution with chloroform-hexane (9:1) yielded fractions containing a single substance with R_f 0.26 (Silufol-254, chloroform-ethyl acetate (8:2)). After the solvent had been distilled off, the residue was recrystallized from benzene, and lustrous crystals were isolated with mp 180-181°C, M^+ 284, λ_{\max} (ethanol) 282, 287, and 311 nm. The UV spectrum was characteristic for pterocarpan. The IR spectrum revealed signals of an OH group (3480 cm^{-1}) and of aromatic C=C bonds (1506 , 1043 , 1020 , 935 cm^{-1}). PMR spectrum (Py-d₅, δ , ppm): 3.42-3.92 (2H, m, H-6), 4.18 (1H, m, H-6a), 5.50 (1H, d, 6 Hz, H-11a), 5.85 (1H, d, 1.5 Hz, -OCH₂O-), 6.60 (1H, s, H-10), 6.80 (2H, br.s, H-4, H-7), 6.86 (1H, dd, 8.5 Hz and 2.0 Hz, H-2), 7.50 (1H, d, 8.5 Hz, H-1).

The spectral results and a comparison with literature information permitted the conclusion that the substance isolated belonged to the pterocarpan group and was, in fact, inermin — 3-hydroxy-8,9-methylenedioxypterocarpan [5].

When the column was eluted with chloroform-hexane (8:2), yet another substance was isolated, with mp 260-262°C (from methanol), M^+ 268. UV spectrum [λ_{\max} (ethanol) 238, 250, 261, 304 nm] showed that the substance was an isoflavone. Its IR spectrum revealed signals for the absorption of hydroxy groups (3106 cm^{-1}), the carbonyl group of a γ -pyrone ring (1641 cm^{-1}), and aromatic C=C bonds (1573 , 1518 cm^{-1}).

PMR spectrum (Py-d₅, δ , ppm): 3.57 (3H, s, -OCH₃), 6.99 (2H, d, 9.0 Hz, H-3, H-5), 7.72 (2H, d, 9.0 Hz, H-2, H-6), 7.07 (1H, br.s, H-8), 7.14 (1H, dd, 9.0 Hz, 2.0 Hz, H-6), 8.40 (1H, d, 9.0 Hz, H-5), 8.10 (1H, s, H-2).

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The spectral results and a comparison with literature information permitted the substance isolated to be identified as formononetin – 7-hydroxy-4'-methoxyisoflavone [3].

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