The bases isolated were identified by direct comparison with authentic samples, with the exception of (I) and (II). Base (I) was obtained by chromatographing the phenolic fraction of the total material on a column of alumina (with elution by chloroform–methanol (95:5)), mp 189–190°C (chloroform). UV spectrum; $\lambda_{max}^{ethanol}$ 287 nm; $\lambda_{max}^{ethanol+OH^-}$ 295 nm. PMR spectrum of (I) ($CDCl_3 + CD_3OD$, ppm, δ scale, HMDS = 0): 2.45 (s, 6 H, 2 × NCH_3); 3.48 and 3.72 (2 × OCH_3); 6.23–7.27 (10 × ArH). The mass spectrum contained the peaks of ions with m/z 594 (M^+), 593, 487, 403, 381, 192, 191, 190, 174, 168. On the basis of the results of a comparison of the properties of (I) with those of aromoline [2] it was established that they were identical. The fraction eluted by ethyl acetate containing 15% of ethanol yielded base (II) with mp 203–205°C, $[\alpha]_D$ −185° (methanol). UV spectrum of (II): $\lambda_{max}^{ethanol}$ 2.88 nm. PMR spectrum of (II) (deuteropyridine), ppm: 3.49 (s, 12 H, $N(CH_3)_2$; 2 × CH_3); 3.59 (s, 6 H, 2 × OCH_3); 6.45 and 6.94 (singlets, 2 H each, 4 × ArH); broadened two-proton doublet with its center at 5.33 ppm. The mass spectrum of (II) showed the peaks of ions with m/z 355, 354, 340, 324, 205, and 204 (100%). A comparison of the results obtained with the literature permitted base (II) to be identified as N-methylargemonine [3].

Thus, fifteen bases have been isolated from Th. minus, and of these aromoline, N-methylargemonine, thalbadenzine [4], corunnine [5], and thaliximidine [1] have been detected in this plant for the first time.

LITERATURE CITED

1. S. Yu. Yunusov, Alkaloids [in Russian], Tashkent (1981), p. 124.
2. J. M. Saa, M. V. Lakahmikantham, M. J. Mitchell, and M. P. Cava, J. Org. Chem., 41, 317 (1976).
3. F. R. Stermitz and K. D. McMurtrey, J. Org. Chem., 34, 555 (1969).
4. S. Mukhamedova, S. Kh. Maekh, and S. Yu. Yunusov, Khim. Prir. Soedin., 250 (1981).
5. Chen-Loung Chen, Hou-min Chang, E. B. Cowling, Chi-Yin Huang Hsu, and R. P. Gates, Phytochemistry, 15, 1161 (1976).

ALKALOIDS OF Thalictrum foetidum

S. Mukhamedova, C. Kh. Maekh,
and S. Yu. Yunusov

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The stems, seeds, roots, and epigeal part of Thalictrum foetidum L. have been investigated for the presence of alkaloids:

Collection site	Plant organ and vegetation period	Total alkaloids, % on the dry raw material	Alkaloids
TadzhSSR, environs of the village of Sagirdasht	Roots, flowering	0,66	Magnoflorine, isoboldine, glaucine, corunnine, thalicmidine, and base I
KirgSSR, Susamyr	"	0,3	Thalfine, thalfinine, berberine, magnoflorine, base II
"	Stems, budding	0,15	Fetidine, berberine
"	Epigeal part, budding	0,23	Fetidine, isoboldine
"	Seeds, fruitbearing	0,26	Fetidine

The total bases, obtained by the usual method, were separated into phenolic (fraction A) and nonphenolic (fraction B). By chromatography on columns of alumina and silica gel, bases (I) and (II) were obtained, in addition to those isolated previously [1, 2]. Both substances were obtained by chromatographing fraction B on a column of alumina. Base (I) (eluent ethyl acetate) had mp 219–221°C (decomp.), and its UV spectrum [$\lambda_{max}^{C_2H_5OH}$ (nm) 243, 272, 290 (inflection), 353, 433; $\lambda_{max}^{C_2H_5OH+H^+}$ (nm) 254, 285, 383, 495] was characteristic for oxoaporphine alkaloids [3].

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PMR spectrum ($CDCl_3$, ppm, δ scale, HMDS = 0): 3.89 (s, 3 H, OCH_3); 2.97 (s, 9 H, $3 \times OCH_3$). One proton singlets at 6.96, 7.82, and 8.54 were due to protons at C-3, C-8, and C-11, respectively. The protons of the pyridine ring appeared in the form of two one-proton doublets at 7.57 (J = 5.5 Hz) and 8.67 (J = 5.5 Hz). The mass spectrum of (I) had strong peaks of ions with m/z 351 (M^+) and 336 $(M - 15)^+$.

The reduction of (I) with zinc in sulfuric acid followed by Hess methylation yielded (±)-glaucine. Consequently, base (I) was oxoglaucine.

Base (II) (eluent benzene–ether (5:1)) crystallized from chloroform–methanol (1:1), mp 252°C. UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 243, 303, 327, 339 nm (log ε 4.71, 4.33, 3.78, 3.74). PMR spectrum (CF_3COOH), ppm: 2.64 (s, 3 H, $C-CH_3$); 3.61 (s, CH, OCH_3); 6.76 (m, 2 H) and 7.70 (m, 3 H) (5×ArH).

The mass spectrum showed intense peaks of ions with m/z 212 (M^+, 100%), 197, and 169. The facts given above, and also the absence of a depression of the melting point of a mixture with an authentic sample enabled (II) to be identified as harmine [4].

Eleven bases have been isolated from *Th. foetidum*. Harmine and oxoglaucine have been detected in a plant of the genus *Thalictrum* for the first time.

LITERATURE CITED

1. S. Yu. Yunusov, Alkaloids, Tashkent (1981), p. 120.
2. S. Mukhmedova, S. Kh. Maekh, and S. Yu. Yunusov, Khim. Prir. Soedin., 252 (1981).
3. H. Guinaudeau, M. Leboeuf, and A. Cave, Lloydia, **38**, 275 (1975).
4. D. R. Liljegren, Phytochemistry, **7**, 1299 (1969); L. Nattleship and M. Slaytor, Phytochemistry, **10**, 231 (1971).

COMPONENTS OF Haplophyllum perforatum

D. M. Razakova, I. A. Bessonova,
Kh. A. Abdullaeva, and S. Yu. Yunusov

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The plant *Haplophyllum performatum* (family Rutaceae), which is widely distributed in Central Asia and South Kazakhstan, is interesting in view of the fact that its chemical composition depends greatly on the conditions of growth. This plant has yielded 25 alkaloids, many of which are produced only from a definite growth site [2], and therefore *H. perforatum* from new collection points is frequently an independent object of chemical study.

We have investigated the alkaloids of the epigeal part collected in the budding and incipient flowering period in the Baisun region of Surkhandar'ya province (I) and in Chimgan (II).

Methanolic extracts obtained from I (3.93 kg) and II (1.83 kg) were evaporated to dryness and the residues were dissolved in chloroform. The alkaloids were extracted from the chloroform solution (A) with 10% sulfuric acid. From the acid solutions 26 g and 0.71 g of mixtures of bases, respectively, were obtained.

From the total alkaloids of the epigeal parts of I and II we isolated skimmianine (1.57 g), evoxine (1 g), a mixture of crystals (B) and skimmianine (0.02 g), and 7-isopentenyloxy-γ-fagarine (0.01 g), respectively. Chromatography on alumina of the residues obtained by distilling the chloroform solutions (A) gave in the case of I the lignan eudesmine (10.2 g) and the alkaloids perfamine (3.5 g), flindersine (0.65 g), and haplamine (4.56 g), and in the case of (II) eudesmine (2.67 g), flindersine (2.80 g), and haplamine (8.2 g). The substances were identified by direct comparison with authentic samples. The mixture of crystals (B) was rechromatographed on a column of silica gel. Ethyl acetate eluates gave a substance with mp 125-136°C, the spectral characteristics of which [PMR spectrum (δ, ppm, $CDCl_3$): 3.72 (singlet, 3 H, OCH_3); 6.78 and 7.28 (two doublets, 2 H each, two pairs of ortho-aromatic protons); and 6.15 and 7.52 (two doublets, 1 H each, J = 16 Hz,

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