(1.31); 273 (31.1); 269 (2.06); 259 (20.7); 257 (1.84); 241 (1.31); 239 (1.75); 214 (3.85); 213 (7.00); 199 (3.15); 197 (3.5); 171 (9.1); 153 (100.0); 126 (93.2).

Experimental Procedure. MKh 1310 mass spectrometer; SVP-5 system for direct introduction of the sample; temperature of the heater bulb and ionization chamber 150-200°C; collector current 40 μA; ionizing voltage 50 V. The masses of the ions were determined with an accuracy of $5 \cdot 10^{-6}$, the reference substance being perfluorokerosine.

LITERATURE CITED

1. Yu. M. Mil'grom, Ya. V. Rashkes, and L. I. Strigina, Khim. Prir. Soedin., 337 (1986).
2. T. Komori, Y. Ida, Y. Mutou, K. Miyahara, T. Nohara, and T. Kawasaki, Biomed. Mass Spectrom., 2, 65-77 (1975).
3. N. I. Yakubov, Ya. V. Rashkes, N. Sh. Pal'yants, Khim. Prir. Soedin., 345 (1983).

HEDERAGONIC ACID FROM *Dipsacus azureus*

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Triterpene glycosides — dipsacosides A and B — have been isolated previously from the roots of *Dipsacus azureus* Schrenk [1, 2].

We have studied the roots of *D. azureus* collected in the Chimgan mountains, Tashkent province. The ground raw material (5 kg) was extracted with chloroform at room temperature. After the chloroform had been evaporated off, a resinous mass (225 g) was obtained in which by TLC in the ethyl acetate—ethanol—water (100:17:13) system the spots of four substances were detected, with R_f 0.65, 0.70, 0.75, and 0.9.

Part of the chloroform extract (50 g) was chromatographed on a column of cellulose powder with elution by petroleum ether. The fractions containing triterpenoids were rechromatographed on a column of type KSK silica gel with chloroform as eluent. This gave a compound (R_f 0.70) with mp 214-216°C (from methanol) and $[\alpha]_D^{24}$ +60.4 ± 2° (s 1.01; chloroform). Its molecular weight (M^+ 470, corresponded to the composition $C_{30}H_{46}O_4$.

The presence in its PMR spectrum (100 MHz, C_5D_5N, δ, ppm, 0 — HMDS) of the signals of the protons of six methyl groups (0.81-1.07 ppm), of an olefinic proton at a trisubstituted double bond (5.39 ppm), and also the fragments formed in mass-spectrometric decomposition (peaks with m/z 248, 222, and 203) indicated that the substance which we had isolated was a triterpenoid of the olean-12-ene series.

The triterpenoid contained a primary hydroxy group, as was shown by two one-proton doublets in the PMR spectrum at 3.51 and 3.88 ppm with a spin-spin coupling constant of ^2J = 10 Hz.

In the spectrum of the acetyl derivative, which was obtained in amorphous form, these protons appeared in the shape of a singlet in the 4.17 ppm region.

On the IR spectrum of the substance, in addition to absorption bands in the 3380-3450 cm^{-1} region, bands were observed of a six-membered cycic ketone (1715 cm^{-1}) and of the carbonyl of a carboxy group (1695 cm^{-1}).

A peak in the mass spectrum with m/z 222 clearly showed that the hydroxy and keto groups were localized in rings A and B.

From its spectral characteristics, the substance that we have isolated corresponded to hederagonic, or 23-hydroxy-3-oxolean-12-en-28-oic, acid. This triterpenoid has been detected previously by Rastogi et al. in *Viburnum erubescens* (family *Caprifoliaceae*) and *Caltha polustrus* (family *Ranunculaceae*) [3, 4].

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To confirm its identity, we obtained hederagonic acid by the direct oxidation of hederagenin with chromium trioxide [5]. The PMR and IR spectra of the natural and synthetic products coincided completely.

LITERATURE CITED

1. M. M. Mukhamedziev and P. K. Alimbaeva, Khim. Prir. Soedin., 451 (1969).
2. M. M. Mukhamedziev, P. K. Alimbaeva, T. T. Gorovits, and N. K. Abubakirov, Khim. Prir. Soedin., 153 (1971).
3. S. K. Agarwal and R. P. Rastogi, Phytochemistry, 13, No. 3, 666 (1974).
4. P. Bhandari and R. P. Rastogi, Phytochemistry, 23, No. 9, 2082 (1984).
5. D. H. R. Barton and P. de Mayo, J. Chem. Soc., No. 3, 887 (1954).

Argemone ALKALOIDS

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According to Ownbey [1, 2], the genus *Argemone* from the family *Papaveraceae* numbers about 30 species. They are all characteristic, in the main, for the flora of North, Central, and South America. Interest in *Argemone* species is due to the specific nature of the various groups of isoquinoline alkaloids contained in them [3].

The alkaloid compositions of *A. ochroleuca* and *A. albiflora* have been studied previously abroad. Both wild-growing plants and plants cultivated in various botanical gardens of Europe have been investigated. A total of 10 alkaloids were isolated from *O. ochroleuca* [4, 5] and 11 from *O. albiflora* [6-8].

In the USSR, *Argemone* species have begun to be studied comparatively recently, since some of them have been successfully introduced [4-7]. Two species of *Argemone* — *A. ochroleuca* Sweet and *A. albiflora* Hornem. were grown for the first time in our country in the Botanical Garden of the Pyatigorsk Pharmaceutical Institute in 1984 from seeds obtained in exchange from the Botanical Garden of the University of Craiova, Romania, and the Halle Botanical Garden (GDR).

To study the alkaloids we used cultivated plants of both species collected in the flowering-fruit-bearing period. Ethanolic extraction of the *A. ochroleuca* raw material gave 0.13% of combined alkaloids, which were separated into nonphenolic and phenolic fractions (tertiary bases) and iodides of quaternary bases. From the nonphenolic fraction were isolated protopine, allocryptopine, chelerythrine, sanguinarine, and berberine; from the phenolic fraction, cheilanthifoline, scoulerine, and reticuline, and from the quaternary-base fraction, berberine iodide. The main alkaloids among those from *A. ochroleuca* were protopine (21%), allocryptopine (16%), and berberine (13%). This is the first time that scoulerine and reticuline have been isolated from *A. ochroleuca*.

The ethanolic extraction of the raw material of *A. albiflora* yielded 0.09% of combined alkaloids, which were also separated into nonphenolic and phenolic fractions (tertiary bases) and iodides of quaternary bases. Protopine, allocryptopine, and berberine were isolated from the nonphenolic fraction, scoulerine and reticuline from the phenolic fraction, and berberine iodide from the fraction of quaternary bases. The main alkaloids of *A. albiflora* berberine were (36%) and allocryptopine (8%). This is the first time that reticuline has been isolated from *A. albiflora*.

All the alkaloids isolated were identified by spectral characteristics and by direct comparison with authentic samples.

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