

V. Z. Usmanov, M. B. Gorovits,  
and N. K. Abubakirov

UDC 547.926:591.147

The comminuted leaves (2.0 kg) of *A. turkestanica* (Rgl.) Briq., family Labiatae collected in July 1970 in the flowering stage (environs of the village of Baisun, Surkhan-Dar'ya oblast) were extracted with 12 liters of methanol. The methanolic extract was concentrated, diluted with water, and treated with petroleum ether. The residual aqueous methanolic fraction, after additional removal of methanol in vacuum, was carefully extracted with ethyl acetate. The ethyl acetate extract, by chromatography on silica gel with elution by chloroform-methanol (9:1) yielded substance (I) (0.025% of the weight of the air-dry raw material) with  $R_f$  0.71 [in a thin fixed layer of silica gel, chloroform-methanol (4:1)]. Subsequent elution with chloroform-methanol (4:1) gave compound (II) (0.020%), with  $R_f$  0.50 (same conditions for chromatography).

Substance (I),  $C_{29}H_{44}O_8$  had mp 158-160°C (methanol),  $[\alpha]_D^{20} + 60.0 \pm 3.0^\circ$  (c 1.00; pyridine)  $\lambda_{max}^{C_2H_5OH}$  245 nm ( $\epsilon$  4,05);  $\nu_{max}^{KBr}$  3450  $cm^{-1}$  (OH), 1752  $cm^{-1}$  ( $\gamma$ -lactone), 1660  $cm^{-1}$  (cyclohexenone). NMR spectrum in  $C_5D_5N$  at 100 MHz ( $\delta$  scale, internal standard HMDS) 0.94 ppm (3H at C-19, singlet), 1.11 ppm (3H at C-18, singlet), 1.24 (6H at C-27 and C-29, doublet,  $J = 6$  Hz), 1.44 (3H at C-21, singlet), 6.15 ppm (1H at C-7). In the mass spectrum of (I) (MKh-1303, 160°C, energy of the ionizing electrons 40 eV), in addition to the weak molecular peak with  $m/e$  520, peaks of ions with  $m/e$  502, 484, 469, 466, 451, 448, 433, 430, 415, 363, 345, 327, 300, 183, 157 were found. These characteristics show that compound (I) is cyasterone [1].

Substance (II),  $C_{27}H_{44}O_7$ , was obtained with a double melting point 152-154°C and 235-236°C (from aqueous methanol) and also 242-244°C (from dry acetone),  $[\alpha]_D^{20} + 54.5 \pm 2.5^\circ$  (c 0.52; methanol);  $\lambda_{max}^{C_2H_5OH}$  243 nm ( $\epsilon$  4,09);  $\nu_{max}^{KBr}$  3370-3450 (OH), 1660  $cm^{-1}$  (cyclohexenone). NMR spectrum (conditions analogous to those for cyasterone) (ppm): 0.93 (3H at C-19, singlet), 1.06 (3H at C-18, singlet), 1.24 (6H at C-26 and C-27, singlet), 1.44 (3H at C-21, singlet), 6.00 (1H at C-7). These facts, and also the mass spectrum of compound (II), containing the peak of the molecular ion with  $m/e$  480 and ions with  $m/e$  462, 444, 426, 408, 345, 344, 328, 327, 99 and 81 make it possible to consider that (II) is ecdysterone [2, 3]. The identity of (II) as ecdysterone was also confirmed by a direct comparison with an authentic sample kindly given to us by Ya. K. Yatsyuk [4]. Cyasterone and ecdysterone have been found previously in the leaves of *Ajuga decumbens* Thunb. ("kiranso") [5].

## LITERATURE CITED

1. H. Hikino, Y. Hikino, K. Nomoto, and T. Takemoto, *Tetrahedron*, **24**, 4895 (1968).
2. P. Hocks and R. Wiechert, *Tetrahedron Lett.*, 2989 (1966).
3. H. Hoffmeister and H. F. Grützmaier, *Tetrahedron Lett.*, 4017 (1966).
4. Ya. K. Yatsyuk and G. M. Segal', *Khim. Prirodn. Soedin.*, **6**, 281 (1970).
5. S. Imai, T. Toyosato, M. Sakai, Y. Sato, S. Fūjloka, E. Murata, and M. Goto, *Chem-Pharm. Bull.*, **17**, 340 (1969).

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR. Translated from *Khimiya Prirodnikh Soedinenii*, No. 4, pp. 535-536, July-August, 1971. Original article submitted April 8, 1971.

© 1973 Consultants Bureau, a division of Plenum Publishing Corporation, 227 West 17th Street, New York, N. Y. 10011. All rights reserved. This article cannot be reproduced for any purpose whatsoever without permission of the publisher. A copy of this article is available from the publisher for \$15.00.