

CYCLOCEPHALOGENIN AND CYCLOGALEGIGENIN FROM *Astragalus caucasicus*

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We have continued research on cycloartane methylsteroids and their glycosides from plants of the genus *Astragalus* (Leguminosae) in Georgia. We isolated previously from the aerial part of *A. caucasicus* the cycloartane glycoside cycloascauloside A [1].

Slightly polar components of this plant were isolated from air-dried ground leaves (1 kg) collected in July 2003 near Lisi, Mtskhet Region, Republic of Georgia, by extracting three times with ethanol (80%, 10 L). The ethanol extracts were distilled to an aqueous residue that was worked up three times with CHCl₃ (3 × 200 mL). The CHCl₃ extract was evaporated. The residue was worked up with hot water and filtered. The aqueous solution was evaporated to dryness. The dry solid (11.2 g) was fractionated over a column of silica gel with elution by CHCl₃:CH₃OH (10:1). The fraction containing triterpenoids (2.2 g) was rechromatographed over a column of silica gel using CHCl₃:CH₃OH:H₂O (70:23.5:2) to afford cyclocephalogenin (**1**, 890 mg) and cyclogalegigenin (**2**, 500 mg).

Compound **1** was identified using PMR and ¹³C NMR spectra (Table 1), which were interpreted using two-dimensional HSQC, HMBC, and DEPT spectra. Compound **2** was identified using spectral data and direct comparison with an authentic sample [1].

Compound **1** was previously determined in glycosides [2-5] and was found only once in the free state in roots of *A. zahlbruckneri* [6].

NMR spectra were obtained on a Bruker spectrometer at working frequency 400 MHz for ¹H and 100 MHz for ¹³C.

TABLE 1. Chemical Shifts of C and H Atoms in **1** (CDCl₃/acetone-D₆)(C₅D₅N, δ, ppm, 0 = TMS)

C atom	DEPT	δ _C	δ _H	C atom	DEPT	δ _C	δ _H
1	CH ₂	32.2	1.58, 1.20	16	CH	73.9	4.62
2	CH ₂	29.7	1.74, 1.59	17	CH	60.0	1.95
3	CH	78.0	3.24	18	CH ₃	20.3	1.45
4	C	41.3	-	19	CH ₂	31.3	0.39, 0.53
5	CH	53.1	1.34	20	C	79.2	-
6	CH	68.7	3.44	21	CH ₃	27.6	1.51
7	CH ₂	37.7	1.44, 1.34	22	CH ₂	25.7	2.63, 1.16
8	CH	47.2	1.80	23	CH ₂	22.7	2.17, 1.72
9	C	20.5	-	24	CH	68.6	3.49
10	C	29.4	-	25	C	75.2	-
11	CH ₂	25.9	2.03, 1.16	26	CH ₃	27.4	1.28
12	CH ₂	33.5	1.87, 1.68	27	CH ₃	27.3	1.20
13	C	46.4	-	28	CH ₃	19.8	0.93
14	C	45.6	-	29	CH ₃	27.7	1.23
15	CH ₂	47.1	1.99, 1.47	30	CH ₃	14.8	0.95

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