

NYMPHAYOL AND GERBOLIDE A FROM *Artemisia porrecta*

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The genus *Artemisia* L. is one of the largest taxa in the Asteraceae family and is interesting with respect to chemistry because it is the source of many secondary metabolites including terpenoids, flavonoids, and coumarins [1, 2]. We studied the aerial part of *A. porrecta* Krasch. ex Poljakov growing in South Kazakhstan Province, Republic of Kazakhstan [3].

The aerial part (leaves, flower heads, buds) of the plant (0.450 kg) that was collected during flowering in Dombra-Syrnai gorge in the vicinity of Karatau State Preserve of South Kazakhstan Province was extracted (3×) with CHCl₃ to afford total extracted substances (45.0 g). The condensed extract was worked up with aqueous EtOH (1:2). The filtrate was worked up with CHCl₃ (1:1). The resulting total extracted substances (20.13 g) were chromatographed over a column of KSK silica gel (extract:sorbent ratio 1:25).

Elution of the column by petroleum ether:EtOAc (95:5) isolated colorless crystalline compound **1**, mp 139–141°C, C₂₅H₄₂O. The yield was 0.037 g (0.009% calculated for air-dried raw material), *R_f* 0.47 (petroleum ether:EtOAc, 4:2).

Based on spectral data (IR, UV, PMR, and ¹³C NMR), physicochemical constants, and comparison with an authentic sample, **1** was identified as 25,26-dinorcholest-5-en-3β-ol, i.e., the steroid nymphayol, which was isolated previously from *Nymphaea stallata* Willd. [4].

Elution of the column by petroleum ether:EtOAc (9:1) isolated colorless crystalline compound **2**, mp 168–170°C. The yield was 0.068 g (0.015% calculated for air-dried raw material), *R_f* 0.31 (petroleum ether:EtOAc, 2:3).

The mass spectrum of **2** contained a peak for the molecular ion with *m/z* 292.2 [M]⁺. According to high-resolution mass spectrometry data, **2** had the formula C₁₇H₂₄O₄.

According to IR, UV, PMR, ¹³C NMR, and mass spectral data, **2** was the sesquiterpene lactone 9β-acetoxy-6β,7α,11β(H)-germacr-1(10),4(5)-dien-12,6-olide (herbolide A), which was isolated previously from *A. herba-alba* subsp. *valentine* [5].

Thus, the chemical study of the aerial part of *A. porrecta* isolated the steroid nymphayol and the germacrane sesquiterpene lactone herbolide A, which were identified from this species for the first time.

REFERENCES

1. L. N. Pribytkova and S. M. Adekenov, *Flavonoids from Plants of the Genus Artemisia* [in Russian], Gylym, Almaty, 1999, p. 180.
2. V. M. Malikov, A. I. Saidkhodzhaev, and Kh. N. Aripov, *Chem. Nat. Compd.*, **34**, 202 (1998).
3. *Flora of Kazakhstan* [in Russian], Vol. 9, Alma-Ata, 1966, p. 639.
4. P. Subash-Babu, S. Ignacimuthu, P. Agastian, and B. Varghese, *Bioorg. Med. Chem.*, **17**, 2864 (2009).
5. R. Segal, I. Feuerstein, H. Duddeck, M. Kaiser, and A. Danin, *Phytochemistry*, **22**, 129 (1983).