

DETECTION OF SHONACHALIN A IN CERTAIN SPECIES OF *Artemisia* L.

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The new sesquiterpene lactone artapshin was previously isolated from *Artemisia* sp. collected in Apsheron and preliminarily determined as *Artemisia fragrans* Willd. [1]. In continuation of these studies, we isolated another two sesquiterpene lactones: $C_{15}H_{22}O_4$ (**1**, colorless tar) and $C_{15}H_{20}O_4$ (**2**, mp 148-150°C).

The IR spectrum of **1** contains absorption bands at 3300-3500 (OH groups), 1770 (CO- of a γ -lactone ring), 1670 and 1650 cm^{-1} (double bonds). Acetylation of **1** at room temperature produces a monoacetate of composition $C_{17}H_{24}O_5$, mp 130-132°C. The IR spectrum of it contains bands for OH groups (3320 cm^{-1}), CO groups of a γ -lactone ring (1780 cm^{-1}), acetyl CO groups (1730 and 1250 cm^{-1}), and double bonds (1680 and 1650 cm^{-1}).

The NMR spectrum of **1** gives signals for a secondary methyl group on C11 (d, 1.66 ppm, $J = 7$ Hz, 3H, $CH_3-CH<$), a vinylmethyl group on C4 (d, 1.69 ppm, $J = 1.2$ Hz, 3H), an acetyl group (s, 2.10 ppm, 3H), a geminal hydroxy proton on C1 (q, 3.85 ppm, $J_1 = 11$, $J_2 = 5$ Hz, 1H, $-CH-OH-$), a lactone proton (H6, t, 4.5 ppm, $J_1 = J_2 = 10$ Hz, $-CH-O-$), a geminal acetyl proton (H8, m, 5.07 ppm), an olefinic proton (H5, d, 5.20 ppm, $J = 10$ Hz), and an exo methylene group on C10 (s, 5.26 ppm, 2H, $>C=CH_2$).

The IR and NMR spectra of **1** agree with those published for shonachalin A [2].

Treatment of **1** with 50% H_2SO_4 [3] and acetylation of the resulting product produces a compound of composition $C_{19}H_{26}O_6$, mp 160-162°C. Its IR spectrum contains maxima of a γ -lactone ring (1780 cm^{-1}), CO- acetyl groups (1740, 1243, 1255 cm^{-1}), and a double bond (1660 cm^{-1}). The NMR spectrum of **1** contains signals for a angular methyl group (s, 0.97 ppm, 3H), a secondary methyl group (d, 1.25 ppm, $J = 7$ Hz, 3H, $CH_3-CH<$), two acetyl groups (s, 2.05 and 2.06 ppm, $2CH_3-CO-$), and an exo methylene group (s, 4.88 and 5.02 ppm, $CH_2=C<$). Gem acetyl protons appear as a quartet (4.80 ppm, $J_1 = 11$, $J_2 = 5$ Hz) and a sextet (5.10 ppm, $J_1 = 5$ Hz, $J_2 = J_3 = 12$ Hz).

The IR and NMR spectra of diacetyl derivative **1** and diacetylartapshin [1] have the same details.

The IR spectrum of **2** contains absorption bands for hydroxyls (3200-3370 cm^{-1}), a γ -lactone ring (1770 cm^{-1}), a CO group conjugated to a ketone in a six-membered ring (1675 cm^{-1}), and a conjugated double bond (1625 cm^{-1}). A maximum in the UV spectrum (241 nm, $\lg \epsilon$ 3.98) confirms that **2** contains a conjugated ketone.

The physicochemical properties of **2** (composition, melting point, IR and UV spectra) are similar of dehydroshonachalin A [2]. Dehydroshonachalin A and **2** have identical IR spectra. Preparation of **2** by oxidation of shonachalin A by CrO_3 in acetone confirmed that **2** and shonachalin A are identical.

Compounds with physicochemical properties identical to shonachalin A and dehydroshonachalin A have also been isolated from *A. gypsacea* [4], *A. herba-alba* subsp. *herba-alba* [5], *A. caerulescens* subsp. *gargantae* [6], *A. oliveriana* [7], and *A. barrelieri* [8]. Shonachalin A was first isolated from *A. feodorovii* Rzazade [2, 9], a new species of *Artemisia* described by Rzazade [10] that was not admitted by Polyakov and assigned to *A. fragrans* Willd. [11].

REFERENCES

1. S. V. Serkerov and A. N. Aleskerova, *Khim. Prir. Soedin.*, 578 (1983).
2. S. V. Serkerov and A. N. Aleskerova, *Khim. Prir. Soedin.*, 196 (1985).
3. I. S. Akhmedov, Sh. Z. Kasymov, and G. P. Sidyakin, *Khim. Prir. Soedin.*, 691 (1970).

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4. A. Rustaiyan, K. Zare, M. T. Ganji, and H. A. Sadri, *Phytochemistry*, **28**, 1535 (1989).
5. A. Marco, *Phytochemistry*, **28**, 3121 (1989).
6. J. F. Sanz and A. Marco, *Phytochemistry*, **29**, 2913 (1990).
7. J. F. Sanz, A. Rustaiyan, and A. Marco, *Phytochemistry*, **29**, 2919 (1990).
8. A. Marco, J. F. Sanz, A. Yusta, M. Carda, and J. Jacupovic, *Phytochemistry*, **30**, 3661 (1991).
9. S. V. Serkerov and A. N. Aleskerova, Abstracts of Papers from the VIIIth Delegate Convention of the All-Union Biological Society, Nauka, Alma-Ata (1988), p. 31.
10. R. Ya. Rzazade, *Izv. Akad. Nauk Az. SSR*, No. 3, 17 (1955).
11. P. P. Polyakov, *Flora Azerbaidzhana*, **8**, 308 (1961).