COMPONENTS OF *Aerva lanata*

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The aerial part of *Aerva lanata* Juss has yielded O-acylglycosides, β-sitosterol, daucosterol, syringic acid, vanillic acid, feruloylthyramine, feruloylhomovanillylamine, narcissin, and aervitrine [1-4].

Ground and air-dried raw material (1.3 kg) collected during flowering (August 1999) in the Mid-Chirchiksk region (Tashkent district, Republic of Uzbekistan) was extracted with water. The aqueous extract was condensed in vacuo and treated with *n*-butanol. The solvent was removed to yield a butanol fraction (14.0 g) that was chromatographed over a silica-gel column with gradient elution by $CHCl_3$—CH_3OH (97:3—80:20). Preparative TLC of the individual fractions isolated **1**-**5**, which were identified using PMR, UV, IR, and mass spectra, chemical transformations, and comparison with authentic samples.

Compounds **1-3** were identified as vanillic, syringic, and ferulic acids, respectively, by examining their physicochemical properties and spectra [2-6].

Isorhamnetin-3-O-β-D-glucoside (4), $C_{22}H_{22}O_{12}$, mp 162-164°C. UV spectrum (EtOH, λ_{max}, nm): 257, 267, 360. The IR spectrum contains absorption bands of hydroxyls (3394 cm^{-1}), methoxyl (2935), carbonyl of γ-pyrone (1655), aromatic C=C (1611, 1578, 1513), and glycoside C–O (1076, 1025).

The PMR spectrum (100 MHz, C_5D_5N, δ, ppm, J/Hz) contains signals at 3.50-4.52 (sugar protons), 3.82 (3H, s, OCH_3), 6.00 (1H, d, J = 7.0, H-1″), 6.48 (1H, d, J = 2.0, H-6), 6.65 (1H, d, J = 2.0, H-8), 7.12 (1H, d, J = 8.0, H-5′), 7.65 (1H, dd, J = 2.0 and J = 8.0, H-6′), 8.15 (1H, d, J = 2.0, H-2′).

Acid hydrolysis of **4** produced isorhamnetin ($C_{16}H_{12}O_7$, mp 305-307°C, M^+ 316) and D-glucose. Acetylation of **4** by acetic anhydride in pyridine gave the heptaacetyl derivative. The mass spectrum of this derivative contains a peak for the molecular ion with *m*/*z* 772 and strong peaks for fragments of the tetraacetylhexose with *m*/*z* 331, 329, 271, and 169 [7-9].

Narcissin (5) (isorhamnetin-7-O-rutinoside), $C_{28}H_{32}O_{16}$, mp 177-179°C. UV spectrum (EtOH, λ_{max}, nm): 254, 265sh, 305sh, 356. The IR spectrum contains absorption bands for hydroxyls (3370 cm^{-1}), methoxyl (2928), carbonyl of γ-pyrone (1656), aromatic C=C (1608, 1508), and glycoside C–O (1075, 1017).

The PMR spectrum (100 MHz, C_5D_5N, δ, ppm, J/Hz) contains signals at 1.35 (3H, d, J = 6.0, CH_3), 3.50-4.50 (10H, sugar), 3.80 (3H, s, OCH_3), 4.80 (1H, br.s, H-1‴), 5.78 (1H, d, J = 7.0, H-1″), 6.56 (1H, d, J = 2.5, H-6), 6.73 (1H, d, J = 2.5, H-8), 7.25 (1H, d, J = 8.0, H-5′), 7.80 (1H, dd, J = 2.5 and J = 8.0, H-6′), 8.26 (1H, d, J = 2.5, H-2′).

Acid hydrolysis of **5** produced isorhamnetin, D-glucose, and L-rhamnose. Acetylation of **5** by acetic anhydride in pyridine gave the nonaacetyl derivative with mp 118-120°C. The mass spectrum (1002, $[M]^+$) contains strong peaks for fragments of the terminal rhamnose with *m*/*z* 273 (100%), 213, 153, and the acylated biose with *m*/*z* 561 [4, 7, 8].

Compounds **3** and **4** are isolated from *Aerva lanata* for the first time.

REFERENCES

1. A. M. Zadorozhnyi, G. G. Zapesochnaya, L. N. Pervykh, A. V. Shchavlinskii, L. S. Kovtun, and N. V. Svanidze, *Khim.-Farm. Zh.*, **20**, 855 (1986).
2. G. G. Zapesochnaya, V. A. Kurkin, and L. N. Pervykh, *Khim. Prir. Soedin.*, 694 (1990).
3. G. G. Zapesochnaya, L. N. Pervykh, and V. A. Kurkin, *Khim. Prir. Soedin.*, 388 (1991).

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4. L. N. Pervykh, B. S. Karasartov, and G. G. Zapesochnaya, *Khim. Prir. Soedin.*, 581 (1992).
5. M. P. Yuldashev, E. Kh. Batirov, A. Nigmatullaev, and V. M. Malikov, *Khim. Prir. Soedin.*, 355 (1994).
6. N. S. Fursa, V. I. Litvinenko, and L. E. Belyaeva, *Khim. Prir. Soedin.*, 416 (1977).
7. T. J. Mabry, K. R. Markham, and M. B. Thomas, *The Systematic Identification of Flavonoids*, Springer-Verlag, Berlin (1970), Chap. V.
8. L. K. Klyshev, V. A. Bandyukova, and L. S. Alyukina, *Plant Flavonoids* [in Russian], Nauka, Alma-Ata (1978).
9. V. A. Iriste and K. F. Blinova, *Khim. Prir. Soedin.*, 435 (1973).