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FLAVONOIDS OF AERIAL PARTS OF AN ENDEMIC SPECIES OF THE APIACEAE OF ALGERIA, *Ammoides atlantica*

S. Louaar,[1] S. Akkal,[1*] C. Bayet,[2] H. Laouer,[3] and D. Guilet[2] UDC 547.972

The genus *Ammoides* (Apiaceae) tribe of Ammineae includes two species in Algeria, one of which is endemic: *Ammoides atlantica* (Coss. et Dur.) Wolf; the other one, *Ammoides pusilla* (Brot.) Breistr, is widespread in the Mediterranean region [1].

The aerial parts of *Ammoides atlantica* were collected from Megress Mountain (Eastern Algeria) at 1500 m above sea level during June 2004 and identified by Dr. H. Laouer. A voucher specimen (B6308) has been deposited in the Museum d'Histoire Naturelle of Nice (France).

The air-dried powdered parts (700 g) of *A. atlantica* were macerated three times in boiling methanolic solution (70%). The MeOH extract was concentrated to dryness, the residue was dissolved in boiling water (600 mL) after filtration, and the residue was extracted successively three times with AcOEt and *n*-butanol (3×200 mL) to give 2.5 and 22.7 g of the respective residues. Solvents were evaporated and the residues of *n*-BuOH and AcOEt extracts were dissolved in small volumes of MeOH. Analysis by two-dimensional paper chromatography using 15% AcOH and BAW (*n*-BuOH–AcOH–H_2O, 4:1:5, upper phase) as solvents indicated that extracts of *n*-BuOH and AcOEt contain identical separation of flavonoids. The AcOEt extract was applied to a column of silica gel and eluted with a gradient of *n*-hexane–AcOEt–MeOH with increasing polarity to obtain nine fractions (A-I). Concentration under reduced pressure of fractions B, D, and G gave three precipitates, which were filtered and washed with MeOH to obtain three compounds **1** (10 mg), **2** (32 mg), and **3** (40 mg). Fraction C was purified by preparative TLC on silica gel eluted with *n*-hexane–AcOEt (2:8) to afford compound **4** (10 mg). Final purification of each compound for spectral analysis was carried out using MeOH over Sephadex LH-20 (Pharmacia Fine Chemicals), prior to UV, MS, and ^{1}H spectral analysis [2, 3]. Hydrolysis of the glycosides **3** and **4** (HCl 0.1 N, 2 h) yielded the sugar residues and the aglycones, all of which were chromatographed with authentic samples. ^{1}H NMR spectra were recorded in CD_3OD at 300 MHz. All the structures were in good agreement with literature data.

Compound 1, $C_{15}H_{10}O_5$, mp 345°C, identified as apigenin [4].

Compound 2, $C_{15}H_{10}O_6$, mp 330°C, identified as luteolin [5].

Compound 3, $C_{21}H_{20}O_{10}$, mp 220–222°C identified as apigenin 7-*O*-glucoside [6].

Compound 4, $C_{21}H_{20}O_{11}$, mp 239–242°C, identified as luteolin 7-*O*-glucoside [7].

Only one flavonoid, luteolin 7-*O*-glucoside [7], has recently been reported from an Egyptian *A. pusilla.* Compounds **1–4** were isolated for the first time from A. *atlantica,* and compounds **3, 4** are reported for a second time from a *Ammoides species* [6, 7]. Compounds **1** and **2** are new for the genus *Ammoides*.

REFERENCES

1. P. Quezel and S. Santa, *Nouvelle flore de l'Algerie et des regions desertiques,* Tome II, Edition CNRS, Paris, 1962, p. 671.
2. T. J. Mabry, K. R. Markham, and M. B. Thomas, *The Systematic Identification of Flavonoids*, Springer, New York, 1970.

1) Departement de Chimie, Faculte de Sciences, Universite Mentouri Constantine, Route d'Ain el Bey, 25000 Constantine, Algerie; fax: 213 31 81 88 85, e-mail: salah4dz@yahoo.fr; 2) Universite Claude Bernard Lyon 1, Laboratoire de Pharmacognosie, Faculte de Pharmacie, Lyon, France; 3) Departement de Biologie, Universite Ferhat Abbas, Setif, Algerie. Published in Khimiya Prirodnykh Soedinenii, No. 4, p. 416, July-August, 2008. Original article submitted March 5, 2007.

 0009-3130/08/4404-0516

3. K. R. Markham, *Techniques of Flavonoid Identification,* Academic Press, London, 1982, p. 36.
4. N. H. El-Sayed, T. M. El-Kubesy, and T. J. Mabry, *Phytochemistry*, **22**, 762 (1994).
5. R. K. Crowden, J. B. Harborne, and V. H. Heywood, *Phytochemistry*, **8**, 1963 (1963).
6. A. Bousetla, S. Akkal, K. Medjroubi, S. Louaar, S. Azouzi, L. Djarri, N. Zaabat, H. Laouer, E. Chosson, and E. Seguin, *Chem. Nat. Comp.*, **41**, 95 (2005).
7. N. A. M. Saleh, S. I. El-Nougoumy, M. N. El-Hadid, and A. H. Hosni, *Phytochemistry*, **22**, 1417 (1983).