

FLAVANOL OF *Limonium bicolor*

Lian-ru Zhang and Guo-lin Zou

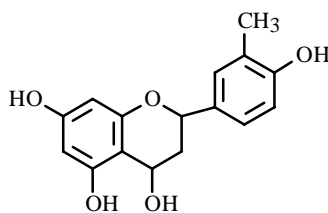
UDC 547.972

Plants of the *Limonium bicolor* (Plumbaginaceae) genus are rich sources of flavonoids [1, 2].

Many of them are used in folk and modern medicine [3–6].

The aerial part of *Limonium bicolor* Kunze (Bge.) can be used as traditional medicine to enrich the blood and hemostasis, to cure emmeniopathy, as well as to treat carcinoma uteri. [3].

The plant material for this study was collected on the north of China, in August 2000 (Inner Mongolia region, PRC). The air-dried powder was defatted with *n*-hexane and successively extracted with CHCl_3 , CHCl_3 -MeOH (9:1) and MeOH in a soxhlet apparatus, each solvent for 6 h, respectively. The methanolic residue was concentrated and chromatographed on Sephadex LH-20, eluted with MeOH; 41 fractions were collected; each fraction was condensed, then submitted to semi-preparative HPLC on a Eclipse XDB C18 column (250 × 9.4mm) eluted with a gradient of MeOH- H_2O from 5:95 to 60:40 for 55 min (flow rate 1.0 ml/min), which led to the isolation of compounds **1-3**. The compounds were identified by UV, mass, and NMR spectra and comparison with authentic samples.



1

The novel compound **1** (5,7,4'-trihydroxy-3'-methylflavan-4-ol) had molecular formula $\text{C}_{16}\text{H}_{16}\text{O}_5$; white powder, mp 248–250°C, UV spectrum (MeOH, λ_{max} , nm): 318, 309, 238.

^1H NMR spectrum (600 MHz, CD_3OD , δ , ppm, J/Hz): 7.120, 6.899, 6.772, (each 1H, dd, J = 2.1, J = 4.56, H-2', H-5', H-6'), 5.882, 5.862 (each 1H, dd, J = 3.1, J = 3.1, H-8, H-6), 5.281 (1H, d, J = 2.55, H-2), 3.036 (2H, d, J = 3.25, H-3), 4.642 (1H, d, J = 2.56, H-4), 2.694 (3H, 3'-Me) [7, 9].

^{13}C NMR spectrum (150 MHz, CD_3OD , δ , ppm): 126.872 (C-2'), 115.062 (C-5'), 122.459 (C-6'), 124.582 (C-3'), 131.102 (C-1'), 135.259 (C-1), 154.282 (C-4'), 95.816 (C-6), 94.957 (C-8), 145.297 (C-5), 159.680 (C-9), 118.005 (C-10), 79.296 (C-4), 78.605 (C-2), 42.901 (C-3), 30.653 (3'-Me).

EI-MS (70 eV) showed ion peaks at 288 (86), 270(10), 153(100), 136 (58), 166 (62), and 123(26); the molecular weight is 288 [8].

Compound **2**, $\text{C}_8\text{H}_8\text{O}_5$ (M^+ 184), white powder, mp 262–264°C (MeOH), UV spectrum (MeOH, λ_{max} , nm): 213, 259. EI-MS m/z (20eV): 184 (M^+), 185 (M+1), 186 (M+2), 153 (M-31), 125 (M-59), 107. EI-MS m/z (70 eV): 153, 184, 125, 107, 79; characterized as methylgallate [8, 10, 11].

Compound **3**, $\text{C}_{15}\text{H}_{16}\text{O}_4$ (M^+ 270), mp 285–287°C (MeOH), UV spectrum (MeOH, λ_{max} , nm): 323, 273. EI-MS m/z (20 eV): 270 (M^+), 242 (M-28), characterized as apigenin [8, 12].

REFERENCES

1. S. Asen, C. M. Roberts, and J. D. Astill, *Phytochemistry*, **11**, 2601 (1972).
2. Pensri Whiting, Tamara Savchenko, D. Satyajit, Sarker, Huw H. Rees, and Laurence Dinan, *Biochem. Syst. Ecol.*, **26**, 695 (1998).
3. T. J. Harborne, Mabry, and Helge Mabry, *The Flavonoids*, Chapman and Hall, 1975, p. 350.
4. Jiang Su, New Medicine College, *Encyclopedia of Chinese Material Medica*, Shanghai, (1977), Vol. 2, p. 2212.
5. Lie-Chwen Lin and Chen-Jen Chou, *Planta Med.*, **66**, 382 (2000).
6. L.C. Lin, Y.C. Kuo, and C. J. Chou, *Planta Med.*, **66**, 333 (2000).
7. Ning Yong-Cheng, *Structural Identification of Organic Compounds and Organic Spectroscopy*, Beijing: Science Press, (2000) p.56.
8. Cong Fu-Zhu, *Mass spectroscopy in Nature Organic Chemistry*, Beijing: Science and Technology Press, (1987), p. 465.
9. Yao Xin-Sheng, *Natural pharmacology*, Beijing: People Hygiene Press, (2002), p.167.
10. S. A. Ross, *Planta Med.*, **39**, 187 (1980).
11. R. I. Reed and J. M. Wilson, *J. Chem. Soc. (C)*, 5949 (1963).
12. Yinrong Lu and L. Yeap Foo, *Food Chem.*, **80**, 71(2003).