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FLAVONOIDS FROM *GONOCYTISUS PTEROCIADUS*

GONOCYTISUS PTEROCIADUS BiTKiSiNiN FLAVONOİTLERİ

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ABSTRACT

Ten flavonoids were isolated from the aerial parts of Gonocytisus pterocladus and identified using thin-layer chromatography, melting points and spectroscopic methods (UV and H NMR) as apigenin, chrysoeriol, luteolin, luteolin 7 O-glucoside, luteolin 7 O-rutinoside, vitexin, isovitexin, rhamnosyl vitexin, orientin and isoorientin.

Key words; Gonocytisus pterocladus, flavonoids

ÖZET

Gonocytisus pterocladus bitkisinin topraküstü kısımlarından izole eden 10flavonoit ince tabaka kromatografisi, ergime noktasi ve spektroskopik yöntemler kullanılarak apigenol, krizoeriyol, luteolol, luteolol 7-O-glukozit, luiteolol 7 O-rutinozit, viteksin, izoviteksin, ramnozil viteksin, orientin ve izoorientin olarak teşhis edilmiştir.

Anahtar kelimeler: Gonocytisus pterocladus, flavonoitler

INTRODUCTION

The genus of *Gonocytisus* Spach (Fabaceae) is represented by three species *G. angulatus* (L.) Spach, *G dirmilensis* Hub.-Mor. and *G pterocladus* (Boiss.) Spach in Turkish flora (1). We previously reported alkaloids from these three species (2-4) and flavonoids from *G. angulatus* and *G dirmilensis* (5, 6). In this paper, the flavonoids of *G pterocladus* which have not been studied before were reported.

MATERIAL AND METHODS

Plant material

The research material of *Gonocytisus pterocladus* was collected from Narhca (Hatay-Turkey) during the flowering period. Voucher specimen is preserved in "Ankara Üniversitesi Eczacılık Fakültesi Herbaryumu", Ankara, Turkey (AEF No. 19606).

Extraction and isolation

After drying and powdering, the plant material was extracted with MeOH in a Soxhlet apparatus for 40 hours and the solvent was evaporated under vacuum to dryness. The crude residue was dissolved in H_20/CH_3OH (90:10) and soluble part was extracted with petrol and EtOAc successively. The EtOAc fraction was dried with anhydrous Na_2S0_4 and evaporated under vacuum to give a flavonoid mixture. Flavonoids were isolated by column chromatography and preparative thin-layer chromatography.

General experimental procedures

'H NMR spectra were recorded on a Bruker 400 MHz spectrometer with d_6-dimethylsulphoxide and tetramethylsilane as internal standard. UV spectra were recorded on a Beckman DU 650 UV-vis Spectrophotometer cabled to Star LC-20 printer recorder. Melting points were determined on a Electrothermal 9200 Digital Melting Point Apparatus and uncorrected. Thin-layer chromatography was performed on silica gel 60 F_254 plates (Merck No.5554) in two solvent systems S,: $CHC1_3/CH_30H$ (80:10) and S_2: $CHC1_3/CH_30H/H_20$ (65:25:2). Column chromatography was performed on silica gel 60 (0.040-0.063mm, Merck No.9385) column with S_2 solvent system. Preparative thin-layer chromatography was carried out using Si and S_2 solvent systems on silica gel 60 F_{254} plates (Merck No. 5744).

RESULTS AND DISCUSSION

In the current research, ten flavonoids were isolated from the aerial parts of *G. pterocladus* and identified by thin-layer chromatography, melting points and spectroscopic methods (UV and 'H NMR) as apigenin, chrysoeriol, luteolin, luteolin 7-O-glucoside, luteolin7-0-rutinoside, vitexin, isovitexin, rhamnosyl vitexin, orientin and isoorientin. Among these, luteolin 7-O-glucoside is the major flavonoid. Apigenine, luteolin 7-O-glucoside and isoorientin was not found in the other two *Gonocytisus* species and this is the first report of these compounds from *Gonocytisus* species. Physical and spectral properties of chrysoeriol, luteolin, luteolin7-0-rutinoside, vitexin, isovitexin, rhamnosyl vitexin and orientin were given in our earlier papers (5, 6).

Apigenin

Mp 347-9 °C. UV A^, (CH_3OH) 267, 296, 336 ($NaOCH_3$) 275, 324, 392 ($A1C1_3$) 276, 301, 348, 384 ($A1C1_3$/HC1) 276, 299, 340, 381 (NaOAc) 274, 301, 376 (NaOAc/H_3B0_3) 268, 302, 338. 'H NMR (5 ppm) 6.19 (İH, d, H-6, J=2.2 Hz), 6.38 (İH, s, H-3), 6.49 (İH, d, H-8, J=2.2 Hz), 6.87 (2H, d, H-3', H-5', J=8.3 Hz), 7.78 (2H, d, H-2', H-6', J=8.5 Hz), 12.82 (3H, s, Ar-OH).

Luteolin 7-O-glucoside

Mp 254-6 °C. UV U (CH_3OH) 255, 267, 348 ($NaOCH_3$) 263, 300, 394 ($A1C1_3$) 274, 298, 329, 432 ($A1C1_3$/HC1) 273, 294, 358, 387 (NaOAc) 259, 266, 365, 405 (NaOAc/H_3B0_3) 259, 372. 'H NMR (5 ppm) 3.18-3.71 (6H, m, glucosyl protons), 5.06 (İH, d, H-1", J=7.3 Hz), 6.44 (İH, d, H-6, J=2.1 Hz), 6.73 (İH, s, H-3), 6.78 (İH, d, H-8, J=2.1 Hz), 6.91 (İH, d, H-5', J=8.3 Hz), 7.4 (İH, d, H-2', J=2.3 Hz), 7.42-7.44 (İH, dd, H-6', J=8.1 Hz), 12.97 (3H, s, Ar-OH).

Isoorientin

Mp 234-5 °C. UV X_m (CH_3OH) 242, 255, 271, 349, ($NaOCH_3$) 267, 278, 337, 406, ($A1C1_3$) 278, 302, 332, 429, ($A1C1_3$/HC1) 265, 279, 296, 361, 384, (NaOAc) 276, 323, 393, (NaOAc/ H_3B0_3) 265, 377, 429 nm. 'H NMR (5 ppm) 3.13-3.62 (6H, m, glucosyl protons), 4.87 (İH, s, H-1"), 6.41 (İH, s, H-3), 6.57 (İH, s, H-8), 6.78 (İH, d, H-5', J=8.2 Hz), 7.68 (2H, d, H-2*, H-6^1, J=8.4 Hz), 13.15 (4H, s, Ar-OH).

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