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GALIUM PASCHALE FORSSKAL BİTKİSİNDEN ELDE EDİLEN İRİDOİTLER VE FLAVONOİTLER

IRIDOIDS AND FLAVONOIDS FROM *GALIUM PASCHALE* FORSSKAL

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SUMMARY

Three iridoidal and two flavonoidal compounds have been isolated from *G.paschale*. The flavonoids obtained from *G.paschale* are accepted to be luteolin, apigenin and the iridoidal compounds are accepted to be asperuloside , aucubin and monotropein.

ÖZET

Bu çalışmada *G.paschale* bitkisinden üç iridoidal ve iki flavonoidal bileşik izole edildi. Flavonoidal bileşikler luteolin ve apigenin , iridoidal bileşikler ise asperulozit, okubin ve monotropein olarak saptandı.

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INTRODUCTION

In this study , the iridoidal and flavonoidal compounds of *Galium paschale* Forsskal (Rubiaceae) have been investigated . This family has 606 genera[1] in the world and it is represented with 9 genera and more than 100 species[2] in Turkey. The species are used as diuretic, choleretic , astringent [3,4]

MATERIALS AND METHODS

Plant Material . Aerial parts of *Galium paschale* were collected from Belgrad Forest . Neşet Suyu , in July 1994. The plant was identified by Prof. Dr. Ertan Tuzlacı. A voucher specimen (MARE 4522) is kept in the Herbarium of the Faculty of Pharmacy , University of Marmara.

Extraction of the iridoids and flavonoids. The air-dried aerial parts of the plant (500 g) were extracted with ethanol and methanol . Both of these extracts were concentrated and mixed . Then this mixture was diluted with water and extracted with petroleum ether ,chloroform,ethyl acetate and methanol respectively. The concentrated extracts have been examined by thin layer and paper chromatographies. Because the ethyl acetate and methanol extracts have been found to contain the same compounds , these extracts were combined and investigations were carried out on this mixture.

Isolation of iridoids and flavonoids . This mixture was applied to column chromatography over silica gel (Merck),eluting with petroleum ether,benzen, chloroform , ethyl acetate ,ethanol , methanol and water. Fractions were checked by preparative TLC.

Identification of iridoids and flavonoids . The structure of the iridoidal compounds was identified by UV, IR , H^1- NMR spectrums and with the comparison of reference substances . The identification of the structures of flavonoidal substances was done with the UV spectrums taken with methanol and the shift reagents , and the comparisons done with reference substances.

RESULTS AND DISCUSSION

In conclusion three iridoidal and two flavonoidal compounds have been isolated from *G.paschale* . The flavonoids obtaine d from *G.paschale* are accepted to be luteolin (16 mg) , apigenin (11 mg) and the iridoidal compounds are accepted to be asperuloside(19 mg) , aucubin (26 mg) and monotropein (31 mg).

LUTEOLIN: UV (λmax , nm) MeOH: 348, 290 sh . 267,254. MeOH+NaOMe : 402, 328 sh , 265. MeOH+$AlCl_3$: 420, 328, 302 sh. 274. MeOH+$AlCl_3$ + HCl : 385. 356. 295 sh . 274 . 265 sh. MeOH+NaOAc : 383. 325 sh . 269. MeOH + NaOAc + H_3BO_3 : 428 sh , 373 . 298 sh .260.

APIGENIN : UV (λmax , nm) MeOH : 330. 298 sh .267. MeOH+NaOMe : 390, 324, 272.MeOH+$AlCl_3$:380,345,301,276. MeOH+$AlCl_3$ + HCl : 377. 341, 298, 277. MeOH+NaOAc : 375. 301. 277. MeOH + NaOAc + H_3BO_3 :336,295 sh. 268.

ASPERULOSIDE : UV (λmax ,nm) MeOH:233 . IR (νmax , cm^{-1}) KBr : 3350, 2920. 1750 . 1660 .1640.1270. ^{1}H-NMR δ(ppm) : 6.04 d (J=1.7 Hz. H-1). 7.40 d (J=2.0 Hz, H-3) , 3.52 m (H-5) . 5.79 dd (J= 5.6/2.0 Hz. H-6) . 5.88 s (H-7) . 4.79s (2H-10) . 2.21 s (-OAc). 4.62 d (J= 7.5 Hz . H-1').

AUCUBIN: UV (λmax. nm) MeOH: 203. IR (νmax. cm^{-1}) KBr : 3400. 2860. 1660. 1610. 1440 . 1380 , 1260 . 1190. ^{1}H-NMR δ(ppm) : 4.94 d (J= 7.2 Hz . H-1) .6.30 dd (J=6.1/2.0 Hz . H-3). 5.08 dd (J=6.1/4.0 Hz.H-4). 2.64 m(H-5). 4.43 m(H-6) .5.75 t(H-7) . 2.88 t (H-9). 4.66 d (J=7.7 Hz . H-1').

MONOTROPEIN : UV (λmax . nm) MeOH :234 . IR (νmax , cm^{-1}) KBr : 3550-2500. 1700 . 1650. 1610. 1480. 1360. 1300-1000. ^{1}H-NMR δ(ppm) : 5.45 d (J=2.9 Hz . H-1) . 7.25 s (H-3). 3.45-3.15 m (H-5) .6.11 dd(J= 5.6/2.4 Hz . H-6). 5.53 dd(J = 5.8 / 1.8 Hz . H-7) . 2.58 dd (J = 8.4 / 2.9 Hz . H-9) . 3.46 s (2H-10). 4.6 d (J=8.3 Hz . H-1').

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