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NOTE

Flavonoid Pattern of Semiparasite *Taxillus bracteatus* growing on *Lannea coromandelica* and *Psidium guajava*

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Our interest in the flavonoid constituents of the semiparasite *Taxillus bracteatus*[1] growing on different host plants like *Lannea coromandelica*[2] and *Psidium guajava*[3], prompted us to undertake the phytochemical investigations of the leaves and flowers of the above parasite. Here we report our results.

Results and Discussion

T. bracteatus growing on *L. coromandelica* and *P. guajava* contained the same flavonoid compounds–quercetin and quercetin 3-*O*-β-D-neohesperidoside except in the variation of yield of the latter compound (800 mg in the first host and 360 mg in the second host). This is the first report of the occurrence of quercetin 3-*O*-neohesperidoside in the parasite *T. bracteatus*. The isolation of this compound from the parasite growing on two different hosts suggests that quercetin 3-*O*-neohesperidoside may be of chemotaxonomic value for *T. bracteatus* at species level. It is a conjecture that there is no influence of host on the chemical constituent as the glycoside does not occur in the host plants. In this respect it resembles *Dendrophthoe falcata*[4] (Loranthaceae), *Viscum album*[5] (Viscaceae) and *Phoradendron tomentosum*[6] having no difference in the flavonoid pattern for samples parasitic on different hosts unlike *Cuscuta reflexa*[7] in which host plant has some influence in the formation of chemical constituents in *C. reflexa*.

Experimental

The fresh leaves and flowers (900 g) of the parasite *T. bracteatus* collected separately from the two host plants from Cuddalore near Pondicherry were extracted with 85% ethanol and the solvent was removed under reduced pressure. The aqueous alcoholic concentrate was subjected to fractionation with benzene, ether and ethyl acetate. From the ether fraction, a solid (**1**) was obtained by preparative paper chromatography (Whatman no.1, descending, 50% aqueous acetic acid, 28°, 10 h). It was recrystallised from acetone and identified as quercetin by direct comparison of m.m.p., co-tlc and superimposable ir spectra with authentic sample. The solid from ethyl acetate fraction was crystallised from methanol as yellow crystals (**2**; 800 mg), m.p. 220–22°, $[\alpha]D_{28}$ + 80° (*c*, 0.12 in pyridine); λ_{max} (MeOH) 264, 359 nm, which shifted to 270, 393 with addition of NaOAc; to 265, 379 with NaOAc + H_3BO_3; to 274, 414 with NaOMe; to 270, 412 with $AlCl_3$; to 268, 358, 396 nm with $AlCl_3$ + HCl; ν_{max} (KBr) 3 280br and 1 650 cm^{-1}; compound **2** gave an acetate (**3**), m.p. 144–46°; pmr of peracetate δ ($CDCl_3$, TMS, 200 MHz) 7.94 (1H, d, *J* 9 Hz, H-6′), 7.92 (1H, s, H-2′), 7.38 (1H, d, *J* 9 Hz, H-5′), 6.80 (1H, d, *J* 2 Hz, H-8), 6.4 (1H, d, *J* 2 Hz, H-6), 5.40 (1H, d *J* 8 Hz, H-$1''_{ax}$), 5.25 (1H, s, H-$1''_{eq}$), 2.45, 2.40, 2.30 (12H, 4 × phenolic OCOC*H*$_3$), 2.20, 2.15, 2.10, 2.05 (6 × alcoholic OCOC*H*$_3$), 1.1 (3H, d, *J* 6 Hz, rhamnosyl C*H*$_3$); ^{13}C nmr δ (DMSO-d_6, TMS, 39.5 MHz) 156.516 (C-2), 133.438 (C-3), 177.428 (C-4), 161.248 (C-5), 98.766 (C-6), 164.209 (C-7), 93.674 (C-8), 156.516 (C-9), 104.076 (C-10), 121.303 (C-1′), 116.427 (C-2′), 144.815 (C-3′), 148.499 (C-4′), 115.344 (C-5′), 121.303 (C-6′), 98.766 (C-1″), 76 103 (C-2″, 3″), 70.487 (C-4″), 76.055 (C-5″), 68.32 (C-6″), 100.825 (C-1‴), 70.487 (C-2‴, 3‴), 74.171 (C-4‴), 66.82 (C-5‴), 17.831 (rhamnosyl CH_3 carbon); *m/z* (–ve ion FAB, thioglycerol) 609 $(M-H)^{-1}$, 463 (609-rhamnosyl residue), 301 (609-rhamnosyl glucose residue). 2 *N* HCl hydrolysis on this yellow solid yielded quercetin, rhamnose and glucose. Partial hydrolysis gave quercetin 3-*O*-glucoside and rhamnose. H_2O_2 oxidation[8] furnished neohesperidose. These results characterised the compound as quercetin 3-*O*-β-D-neohesperidoside. The same compound (360 mg yield) was obtained from the parasite on second host plant. The flavonoids and other polyphenolic compounds as shown below have been isolated and characterised from the two host plants. Ellagic acid, quercetin, quercetin 3-*O*-β-D-glucopyranoside and quercetin 3-*O*-α-L-arabinopyranoside have been isolated from *L. coromandelica* and myricetin along with the above compounds from *P. guajava*.

Fresh leaves (500 g) of the host plants *L. coromandelica* and *P. guajava* were refluxed separately, concentrated and fractionated with benzene, ether and ethyl acetate as done for the parasite. The ether fraction from *L. coromandelica* yielded ellagic acid and quercetin and the ethyl acetate fraction, quercetin 3-*O*-glucoside and quercetin 3-*O*-arabinoside. Ellagic acid (MeOH) did not melt upto 360° (300 mg); λ_{max} (MeOH) 260, 300, 365 nm; ν_{max} (KBr) 3 400br (OH), 1 700 cm^{-1} (lactone ring); acetylation

gave tetra-acetate, m.p. 340–42°; δ 7.5 (2H, s, H-5,5′), 2.5 (12H, 3,4,3′, 4′-O–CO–CH_3). Quercetin, m.p. 316–17° (85 mg); λ_{max} (MeOH) 256, 371; (+$AlCl_3$) 270, 458; (+$AlCl_3$ + HCl) 267, 301sh, 354, 431; ν_{max} (KBr) 3 410br (OH), 1 650 (chelated C=O), 1 565, 1 512 cm^{-1} (aromatic). Quercetin 3-*O*-glucoside (30 mg), m.p. 234–36°; λ_{max} (MeOH) 256, 349 nm; (+NaOAc) 274, 322, 374; (+NaOAc + H_3BO_3) 260, 300sh, 365; (+NaOMe) 275, 380 dec.; (+$AlCl_3$) 270, 425; (+$AlCl_3$ + HCl) 265, 350, 400 nm; ν_{max} (KBr) 3 400br (OH), 1 650 (chelated C=O), 1 565, 1 520 cm^{-1} (aromatic). Quercetin 3-*O*-arabinoside (35 mg), m.p. 242–43°; λ_{max} (MeOH) 258, 359; (+NaOAc) 268, 330sh, 386; (+NaOAc + H_3BO_3) 262, 308sh, 378; (+NaOMe) 272, 301sh, 408; (+$AlCl_3$) 272, 300sh, 328, 425; (+$AlCl_3$ + HCl) 268, 300sh, 365sh, 401 nm; pmr δ 7.58 (d *J* 8.6 Hz, H-6′), 7.54 (1H, s, H-2′), 6.88 (1H, d, *J* 8.6 Hz, H-5′), 6.43 1H, s, H-8), 6.23 (1H, s, H-6), 5.3 (1H, *J* 8 Hz, H-1″), 3.69, 3.60, 3.29, 3.19 (5H, m, other sugar protons).

Ether fraction of *P. guajava* yielded ellagic acid, quercetin and myricetin and ethylacetate fraction gave quercetin 3-*O*-α-L-arabinopyranoside. Except myricetin the remaining compounds are similar to those from *L. coromandelica*. Myricetin (90 mg) did not melt upto 340°; λ_{max} (MeOH) 254, 278sh, 301sh, 374; (+NaOAc) 269, 340°(dec); (+NaOAc + H_3BO_3) 258, 304sh, 392; (+NaOMe) 260sh, 286sh, 321, 422(dec); (+$AlCl_3$) 271, 316sh, 450; (+$AlCl_3$ + HCl) 266, 276sh, 307sh, 358sh, 428 nm; ν_{max} 3 330br, 1 660, 1 590, 1 515, 1 320, 1 225, 1 195, 1 180, 1 155, 1 100, 1 085, 1 025, 1 000, 850, 785, 765 and 640 cm^{-1}.

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