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NOTE

Flavonoids from the Flower Extract of *Tecoma stans*

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Systematic chemical investigation of the flower extract of *Tecoma stans* gave two new dihydroflavonols-3,4′,7-trihydroxy dihydroflavonol and 3,4′,5,7-tertrahydroxy-3′,5′-dimethoxy dihydroflavonol along with iso-rhamnetin. The structure elueidation was carried out by spectral analysis, colour reactions and degradation studies.

In continuation of the chemical investigation of flavonoidal constituents of flower extract of *Tecoma stans*[1] we now report three more flavonoids from the extract after two flavonoids[2]. *Tecoma stans* is an annual tree with hard shrubs, having many medicinal[1] properties.

Further fractionation of the flower extract of *Tecoma stans* with acetone gave two compounds T_3 and T_4 and the chloroform fraction gave a single compound T_5. Compound T_3, $C_{15}H_{12}O_5$, m.p. 214°C and compound T_4, $C_{17}H_{16}O_8$, m.p. 254°C gave positive test of dihydroflavonol. Compound T_5, $C_{16}H_{12}O_7$, m.p. 224–225°C gave positive test of flavonol.

The structure elucidation of all the compounds was carried out on the basis of spectral data, specific colour reactions and degradation studies.

T_3: The compound $C_{15}H_{12}O_5$ (M^+ 272) crystallised from ethyl acetate, m.p. 214°C, gave positive tests for dihydroflavonol[3]. The R_f values by PC were 0.58 (BAW 4:1:5), 0.89 (80% MeOH), 0.90 (50% AcOH) and 0.51 (15% AcOH). The UV data[4] in MeOH and in presence of shift reagents were as follows: λ_{max} MeOH 261, 330; + Al Cl_3 292; + NaOMe 332; + NaOAc 320 nm. IR ν_{max} (KBr) 3350, 1680, 1600, 1530, 1456, 1280 cm^{-1} showed the presence of hydroxy, flavone carbonyl groups in the molecule. Mass spectra of the compound gave the fragment signals at m/e 272, 271, 190 and 125. A trimethyl and triacetyl derivative was obtained on methylation and acetylation respectively. Therefore, the compound is a trihydroxy derivative. The 3–OH group was confirmed by specific colour test 60 MHz NMR[5] signal at 4.3 δ (d, 1H, H–3) and 4.7 δ (d, 1H, H–2) and a diagnostic shift of +31 nm with $AlCl_3$ in UV spectra. 7–OH group was confirmed by colour reaction, NMR signals at 7.3 δ (d, 1H, H–5), 6.4 δ (d, 1H, H–6), 6.3 δ (s, 1H, H–8) and a bathochromic shift of +59 nm with NaOAc in UV spectra. 4′–OH group was confirmed by production of blue colour on addition of $NaHCO_3$ in Schinoda test solution and NMR signal at 7.1 δ (d, 4H, H–2′, 3′, 5′, 6′). Alkaline degradation gave resorcinol and *p*-hydroxybenzoic acid.

Therefore, compound T_3 may be assigned as 3,4′,7-trihydroxy dihydroflavonol.

T_4: The compound $C_{17}H_{16}O_8$ (M^+ 348), crystallised from methanol, m.p. 254°C, gave positive test of dihydroflavonol[3]. The R_f values by PC were 0.82 (BAW 4:1:5), 0.82 (BEW 4:1:5) and 0.84 (50% AcOH). The UV data[4] in MeOH along with various shift reagents were as follows: λ_{max} MeOH 280, 340, +NaOMe 315, +NaOAc 286, and +$AlCl_3$ and HCl 308 nm. IR ν_{max}(KBr) 3320, 2920, 1710, 1618, 1580, 1410, 1270 cm^{-1} showed the presence of hydroxyflavone carbonyl, methoxy groups in the molecule. Mass spectra gave signals at m/e 348 (M^+), 347, 317, 153, 150, 137, 122, 121, 107. The compound gave hexamethoxy and tetraacetyl derivative on methylation and acetylation respectively. Therefore, the compound is a tetrahydroxy dimethoxy derivative. Alkaline degradation of the compound gave phloroglucinol and 3,5-dimethoxy, *p*-hydroxybenzoic acid. The position of hydroxy and methoxy groups were confirmed by 60 MHz NMR[5] ($CDCl_3$) spectra, $\Delta\lambda_{max}$ with various shift reagents in UV spectra and specific colour reactions. 3–OH group was assigned due NMR signal—at 4.7 δ (d, 1H, H–2), 4.2 δ (d, 1H, H–3) and positive colour reactions. 4′–OH group was assigned due to development of blue colour on addition of $NaHCO_3$ to Schinoda test solution, NMR signal at 7.3 δ (s, 2H, H–2′, 6′) and a shift of +28 nm (+ $AlCl_3$ + HCl) in UV spectra. 5–OH group was assigned due to production of red colour with Dimorth reagent[6] and a shift of +35 nm (+NaOMe) in UV spectra. 7–OH group was assigned due to positive colour test, NMR signal at 5.9 δ (s, 1H, H–5), 9.3 δ (s, 1H, 7–OH) and a shift of +6 nm (+NaOAc) in UV spectra. NMR signals at 3.9 δ (s, 6H, $2CH_3O$—) and 7.3 δ (s, 2H, H–2′, 6′) proved the presence of two methoxy groups at C–3′ and C–5′.

Therefore, the compound may be represented as 3,4′,5,7-tetrahydroxy, 3′,5′-dimethoxy dihydroflavonol.

T_5: The compound, $C_{16}H_{12}O_7$ (M^+ 366), crystallised from acetone, m.p. 224–225°C was identified as iso-rhamnetin. The structure elucidation was carried out by spectral data, colour reactions, degradation study and direct comparison with an authentic sample by PC and TLC co-chromatography.

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