respectively. Compound E (**1**) crystallized from MeOH as white needles (60 mg), mp 168–70°; R_f: 0.36 (Si gel, C_6H_6–Me_2CO, 19:1), 0.38 (Si gel, C_6H_6–EtOAc, 23:2); MS: M^+ 260. It gave a green fluorescence under UV light and a negative Gibb's test. λ_{max}^{MeOH} nm: 260, 325 (log ε: 3.05, 3.58); ν_{max}^{KBr} cm^{-1}: 3430, 1738, 1640, 1462, 1220, 952 and 830; ^1H NMR ($CDCl_3$): δ 1.29 (6H, *s*, *gem*diMe), 3.32 (2H, *d*, Ar—CH_2—), 4.1 (3H, *s*, —OMe), 5.3 (1H, *m*, =CH—), 6.17 (1H, *d*, J = 10 Hz, H-3), 6.91 (1H, *s*, H-5) and 7.54 (1H, *d*, J = 10 Hz, H-4). It formed a Me ether derivative, **3** (CH_2N_2), mp 93–5° (petrol). λ_{max}^{MeOH} nm: 260, 335; ν_{max}^{KBr} cm^{-1}: 1700, 1620, 1446, 1215 and 952; ^1H NMR ($CDCl_3$): δ 1.66 (6H, *s*, *gem*diMe), 3.25 (2H, *d*, Ar—CH_2—), 3.89 and 3.93 (3H each, *s*, 2 × —OMe), 5.13 (1H, *m*, =CH—), 6.2 (1H, *d*, J = 10 Hz, H-3), 6.89 (1H, *s*, H-5), 7.62 (1H, *d*, J = 10 Hz, H-4); MS *m/e* (% abundance): 274 (M^+, 10), 227 (13), 226 (100), 211 (55), 195 (42), 183 (13), 155 (45), 109 (14) and 66 (27). **3** was different from toddaculin on direct comparison (TLC, IR). **1** formed a cyclized derivative (HCO_2H), **2**, mp 135–6° (EtOAc–petrol); MS: M^+ 260; λ_{max}^{MeOH} nm: 260, 325 (log ε: 3.55, 3.99); ν_{max}^{KBr} cm^{-1}: 1725, 1620, 1457, 1216 and 949; ^1H NMR ($CDCl_3$): δ 1.41 (6H, *s*, *gem*diMe), 1.8 (2H, *t*, J = 7 Hz, Ar—CH_2—$C\underline{H}_2$—), 2.77 (2H, *t*, J = 7 Hz, Ar—$C\underline{H}_2$—), 3.92 (3H, *s*, —OMe), 6.16 (1H, *d*, J = 10 Hz, H_3), 6.86 (1H, *s*, H-5) and 7.49 (1H, *d*, J = 10 Hz, H-4). The demethylated and cyclized product, **4** (pyridinium hydrobromide), mp 207–8°, gave a positive Gibb's test. λ_{max}^{MeOH} nm: 265, 330 (log ε: 3.91, 4.15); ν_{max}^{KBr} cm^{-1}: 3400, 1700, 1620, 1450, 1202 and 937. The Me ether (CH_2N_2) of **4** was identical (TLC, IR) with **2**.

Acknowledgements—The authors are thankful to Prof. R. D. H. Murray, University of Glasgow, for kindly supplying a sample of toddaculin.

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Phytochemistry, 1979, Vol. 18, pp. 1581–1582. © Pergamon Press Ltd. Printed in England. 0031-9422/79/0901-1581 $02.00/0

OCCURRENCE OF (−)-ISOLONCHOCARPIN IN THE ROOTS OF *TEPHROSIA PURPUREA*

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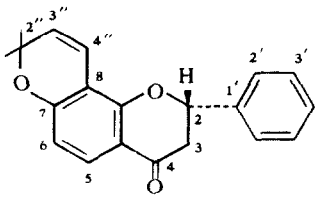
(*Received* 30 *December* 1978)

Key Word Index—*Tephrosia purpurea*; Leguminosae; (−)-isolonchocarpin; pongamol; lanceolatins A and B; flavonoids.

Earlier investigations [1, 2] on *Tephrosia* have revealed the presence of rotenoids and flavonoids. Examination of the roots of *T. purpurea* Pers., which is medicinally useful [3], has now resulted in the isolation of laevorotatory isolonchocarpin and pongamol (lanceolatin C) [4] besides the earlier reported lanceolatin B [5] and lanceolatin A [6].

EXPERIMENTAL

The roots of *T. purpurea* collected around Waltair were powdered and the material was extracted with hot $CHCl_3$. The $CHCl_3$ extract was divided into petrol solubles and benzene solubles. Chromatography of the petrol solubles gave a compound, pale yellow needles from petrol–ether (1:1), mp 108–110°. It gave a single blue fluorescent spot on TLC and analysed for $C_{20}H_{18}O_3$ (M^+ 306). $[\alpha]_D^{28}$ −93° (chloroform). UV λ_{max}^{MeOH} nm: 266, 314; $\lambda_{max}^{MeOH+NaBH_4}$ nm: 232, 280. IR ν_{max}^{Nujol} cm^{-1}: 1680 s (C=O of flavanone); 730 and 700 s (unsubstituted phenyl nucleus) and the other bands are at 1630 m, 1590 s, 1270 m and 1200 m. ^1H NMR (δ values, solvent $CDCl_3$, 100 MHz): A one proton-quartet at 5.48 and two proton-multiplet at 2.84–3.04 were assigned to H-2 and H-3 (*cis*) and H-3 (*trans*) of flavanone. An unsubstituted phenyl nucleus was indicated by a broad multiplet centred at 7.30–7.54. Two doublets at 7.75 and 6.50, each for one proton with J = 8 Hz, were assigned to H-5 and H-6 of the A-ring. The remaining signals in the ^1H NMR spectrum indicated the presence of a 2,2-dimethylchromene system and they are at 1.5 (*s*, 6H, gem-dimethyl) 5.57 (*d*, 1H, J = 10.5 Hz, 3″-H) and 6.67 (*d*, 1H, J = 10.5 Hz, 4″-H). The chromene ring is in the angular position since the coupling constant of the two protons at C-5 and C-6 is high. The mass fragments are at 306 (30.8%) (M^+), 305 (0.5) (M − 1), 291 (82.5) (M − Me), 202 (3.5) (ring A fragment after diene decomposition), 187 (100) (202 − Me), 104 (10) (ethylene fragment). These data led to structure **1**, a flavanone earlier prepared as a racemate by cyclization of the



1

chalcone lonchocarpin isolated from the roots of *Derris sericea* [7]. Later it was reported in the root bark of the same plant [8]. This earlier isolation of racemic isolanchocarpin arouses doubt about its actual occurrence since most naturally occurring flavanones are optically active [9]. It has also been observed [9] that vigorous treatment of chalcones may sometimes give racemic flavanones during isolation.

Since all the laevorotatory flavanones so far isolated have the 2-*S* configuration [10], isolonchocarpin isolated from *T. purpurea* is tentatively assigned the same configuration. A comparison of our compound with isolonchocarpin obtained by cyclization of lonchocarpin showed that they have the same R_f, but differ in mp and optical activity. ^{1}H NMR spectra are almost identical. This is the first report of the isolation of optically active isolonchocarpin from a natural source.

Three other crystalline compounds were isolated from petrol solubles of the $CHCl_3$ extract along with (−)-isolonchocarpin. These were identified as pongamol [4], lanceolatin B [5] and lanceolatin A [6] by mp, UV, IR and direct comparison with authentic samples. This is the first report of isolation of pongamol from this plant.

Acknowledgement—Our thanks are due to Prof. M. C. Nascimento, Centro de pesquisas Produtos Naturais, Rio de Janeiro Zc-82, Brazil, for supplying a sample of isolonchocarpin racemate and its ^{1}H NMR spectrum for comparison.

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