

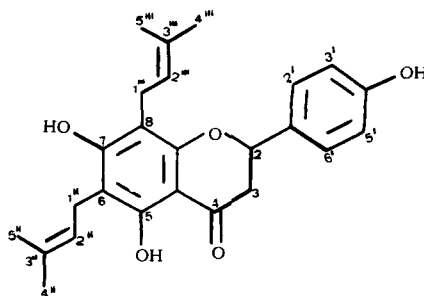
SENEGALENSEIN, A NOVEL PRENYLATED FLAVANONE FROM *ERYTHRINA SENEGALENSIS*¹

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As a continuation of a study on the neutral components of the genus *Erythrina* (1-8), we now report the isolation and structural elucidation of the novel prenylated flavanone, senegalensein [**1**], obtained as a pale yellow oil from the Nigerian medicinal plant *Erythrina senegalensis* DC. (Leguminosae).

Si gel chromatography of the CHCl₃ extract of the stem-bark gave a novel compound [**1**] for which we propose the name senegalensein. The compound [**1**] showed [α]_D -6.7° (CHCl₃) and a molecular formula C₂₅H₂₈O₅. Color tests, ir, and uv indicated that **1** was a 5,7-dihydroxylated flavanone. Its ¹H-nmr spectrum (Table 1) suggested the



1

353 (M⁺-C₄H₇), 297 (M⁺-C₄H₄-C₄H₈), and a retro-Diels-Alder reaction (9) of the parent ion gave the [A]⁺ fragment at *m/z* 288 and the [B]⁺ fragment at *m/z* 120. Confirmation of the assigned structure was afforded by the cy-

TABLE 1. ¹H-nmr Special Data of Senegalensein [**1**] (CDCl₃, 300 MHz)

Proton	δ	number of protons	multiplicity
H-2	5.20-5.30	3	m
H-2''			
H-3'''			
H-3(ax)	3.02	1	dd, J _{AB} = 17 Hz J _{AX} = 12 Hz
H-3(eq)	3.78	1	dd, J _{AB} = 17 Hz J _{BX} = 3 Hz
C ₅ -OH	12.29	1	s, disappears on deuteriation
C ₇ -OH	6.41	1	s, disappears on deuteriation
H-2' and H-6'	7.27	2	d, J = 9 Hz
H-3' and H-5'	6.84	2	d, J = 9 Hz
H-1''	3.28	2	d, J = 6 Hz
H-1'''	3.33	2	d, J = 6 Hz
H-4''	1.78	3	s, Me, (cis)
H-5''	1.68	3	s, Me, (trans)
H-4'''	1.80	3	s, Me, (cis)
H-5'''	1.69	3	s, Me, (trans)

assigned structure. Further evidence for this structure was furnished by the mass spectral data that showed *m/z* 408 (M⁺),

clodehydrogenation of **1** to give erythisenegalone, which we have recently isolated from the same plant (3), and lupinifolin, which was isolated by Vleggar *et al.* (10) from *Tephrosia*

¹Part 10 in the series "Erythrina studies."

lupinifolia. The spectral data for **1** compares very favorably with that of amoradin, amoradicin, and amoradinin, three prenylated flavanones from *Amorpha fruticosa* (11) of similar structure.

Senegalensein [**1**] has earlier been synthesized by Gupta *et al.* (12, 13).

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—

Mps (Kofler hot-stage) are uncorrected. Optical rotations were measured in CHCl_3 and ir spectra in KBr disc. ^1H -nmr spectra were recorded at 300 MHz in CDCl_3 with TMS as internal standard. Eims were obtained at 70 eV using a direct inlet system.

PLANT MATERIAL.—*E. senegalensis* stem-bark was collected at Abagana, Eastern Nigeria, in March 1983. An herbarium specimen documenting the collection is deposited at the National Herbarium, Yaounde, Cameroon. The specimen was identified by the Director of the National Herbarium, Yaounde.

EXTRACTION AND ISOLATION OF COMPOUND.

—Dried, ground stem-bark (14 kg) of *E. senegalensis* was successively extracted with hexane and CHCl_3 . Part of the CHCl_3 extract (90 g) was chromatographed on a Si gel column (500 g) eluting with vary proportions of hexane/EtOAc. Tlc analysis permitted the regrouping of fractions that had the same compounds. Fractions 93-123 (10 g) were rechromatographed on Si gel (300 g) to give a fraction containing two compounds. This mixture was rechromatographed on Si gel and eluted with hexane-EtOAc (7:3) to give a mixture that was mainly one compound. The pure compound [**1**] was isolated on preparative tlc [Si gel, 5 mm, hexane- Me_2CO (7:3)] and obtained as a pale yellow oil (250 mg), $[\alpha]_D -6.7^\circ$ (CHCl_3 , c 0.3); uv λ max (EtOH) nm (ϵ) 272 (24 000), 297 (22 500) 245 (6 300); λ max (EtOH+ AlCl_3) nm (ϵ) 225 (50 900), 280 (18 900), 320 (31 000); λ max (EtOH+ AlCl_3 +HCl) nm (ϵ) 225 (49 200), 280 (18 900), 317 (30 000); ir ν max (KBr) 3400, 1620, 1540. Found: C, 73.45; H, 6.75. $\text{C}_{25}\text{H}_{28}\text{O}_5$, requires C, 73.53; H, 6.45%; ms m/z (%) 408 (M^+) (81), 406 (33), 375 (44), 337 (42), 310 (8), 307 (39), 288 (6), 277 (35), 233 (53), 271 (63), 203 (28), 189 (100), 177 (63), 120 (25), 55 (40), 43 (50), 41 (67).

CYCLODEHYDROGENATION OF SENEGALEN-

SEIN [**1**].—Compound **1** (100 mg) in C_6H_6 (20 ml) and 2,3-dichloro-5,6-dicyanobenzoquinone (200 mg) were heated at 70-80° for 1 h. The crude product that showed two major compounds and two minor ones was chromatographed on Si gel to give, on elution with hexane/EtOAc, erythrisenegalone (35 mg) identical in all respects (mp, mmp, tlc, ir, uv, ^1H nmr, ms) with the natural compound and lupinifolin (25 mg) whose mp, ir, uv, ^1H nmr, and ms were identical to those reported in the literature (10).

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