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A FLAVANONE FROM *LANNEA ACIDA*

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Key Word Index—*Lannea acida*; Anacardiaceae; 6,7,2,2-dimethylchromeno-8,γ,γ-dimethylallyl flavanone.

Abstract—Chromatographic separation of the acetone extract of *Lannea acida* leaves resulted in the separation of a new flavanone, 6,7,2,2-dimethylchromeno-8,γ,γ-dimethylallyl flavanone.

INTRODUCTION

Lannea acida is a small deciduous tree. It is an important drug in the indigenous system of treatment in North Nigeria. The leaves are used as a febrifuge and have been described to be useful in the treatment of gout and rheumatism [1]. No work has been reported on this medicinally important plant. In this communication, we deal with the isolation of a new prenylated chromenoflavanone.

RESULTS AND DISCUSSION

Column chromatography of the acetone extract of the leaves and crystallization yielded (LA-1) white needles, $C_{25}H_{26}O_3$, mp 91–92°. The UV maxima at 222 and 272 nm classified it as an isoflavone or a flavanone [2]. With aqueous NaOH and conc. H_2SO_4 it gave orange-red and dark red colours, respectively, characteristic only of a flavanone. It is readily cleaved with hot aqueous NaOH to give a yellow chalcone, mp 113–115° [3].

The ^{1}H NMR spectrum of the compound showed evidence for the presence of a γ,γ-dimethylallyl unit and a 2,2-dimethylchromene ring. The singlet at $\delta 1.46$ for six protons and the two doublets at $\delta 5.6$ and 6.7 ($J = 11$ Hz) indicated a dimethylchromene ring. The two three proton singlets at $\delta 1.75$ and 1.80 and the doublet at $\delta 3.2$ ($J = 7$ Hz) for two protons and an olefinic proton triplet at $\delta 5.4$ ($J = 7$ Hz) revealed the presence of a γ,γ-dimethylallyl unit. Besides these a sharp singlet at $\delta 7.5$ for five protons (unsubstituted phenyl) and the singlet at $\delta 7.7$ for the C-5 proton suggested that the compound has a trisubstituted 'A' ring having the chromene as well as the dimethylallyl unit and the unsubstituted side phenyl. The presence of a two protons multiplet at *ca* $\delta 3.0$ and a one proton multiplet at *ca* $\delta 5.15$ clearly defined the compound as a flavanone. The NMR spectra of several prenylated chromeno-flavanoids have been reported [3–5] and the above values are in good agreement with them.

The mass spectrum of the flavanone showed an $[M]^+$ peak at *m/z* 374 (10%). Scheme 1 outlines the main pathways of fragmentation. The peak at *m/z* 319 could be accounted for by the loss of C_4H_7. This is analogous to the cleavage of the side chain in scandenone-4-methyl-ether [6].

The above results and biogenetic considerations [7] enable us to formulate the compound LA-1, as 6,7,2,2-dimethylchromeno-8,γ,γ-dimethylallyl flavanone.

EXPERIMENTAL

^{1}H NMR spectra were recorded at 100 MHz in $CDCl_3$ and DMSO-d_6 (TMS int. standard) and values are given in ppm. MS were recorded using a direct inlet system. The progress of CC (silica gel, Merck) was monitored by TLC on Merck silica gel HF_{254} plates visualized by exposure to UV light.

Plant material. Fresh leaves of *L. acida* (Rich) were collected from the campus of Ahmedo Bello University, Zaria, Nigeria. A voucher specimen has been deposited in the Herbarium of the Botany Department, Aligarh Muslim University, Aligarh.

Extraction and isolation. Air dried leaves were extracted with Me_2CO under reflux. After concn under red. pres., the residue was macerated successively with hot hexane, C_6H_6 and EtOAc. The EtOAc extract was passed through a Sephadex LH 20 column for purification, the C_6H_6–EtOAc eluates were then chromatographed on a silica gel 60 column without activation. The C_6H_6–EtOAc (3:1) eluates yielded LA-1 (60 mg), mp 91–92°. 6,7,2,2-Dimethylchromeno-8,γ,γ-dimethylallyl flavanone, compound LA-I: UV λ_{max}^{EtOH} nm: 222, 272; MS *m/z*: 374 $[M]^+$ (10%), 359 (20), 319 (2), 255 (22), 227 (4), 55 (100); ^{1}H NMR: $\delta 1.46$ (6H, *s*, $>CMe_2$), 1.75, 1.8 (2 × 3H, *s*, $>CMe_2$), 3.2 (2H, *d*, $J = 7$ Hz, $-CH_2-$), 5.4 (1H, *t*, $=\overset{H}{C}-$), 5.6, 6.7 (2 × 1H, *d*, $J = 11$ Hz, $\overset{H}{>}C{=}O\overset{H}{<}$), $\delta 7.5$ (5H, *s*, unsubstituted phenyl), 7.7 (1H, *s*, 5-H), 3.0 (2H, *m*, H-3), $\delta 5.15$ (1H, *m*, H-2).

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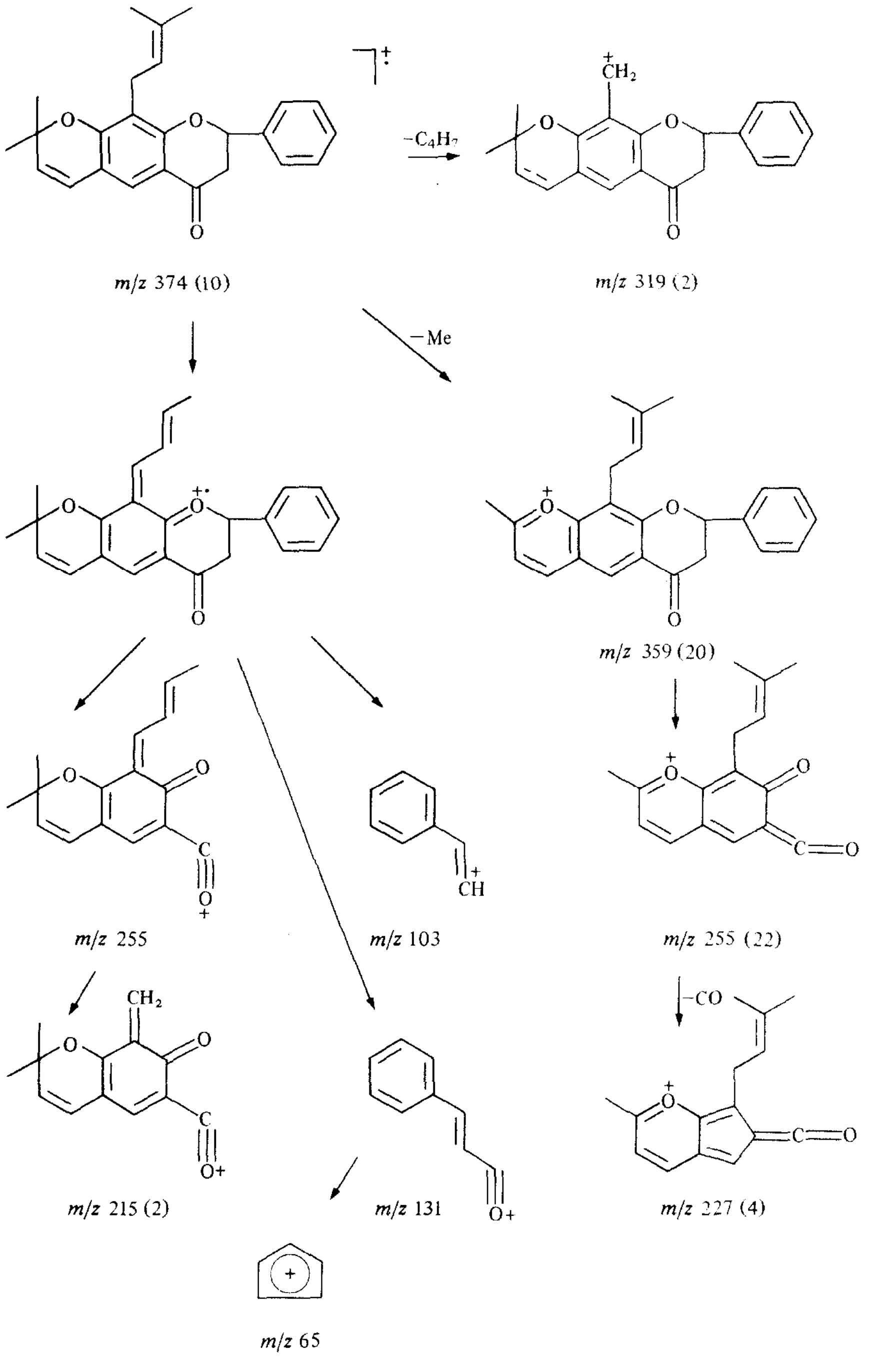

Scheme 1. Mass spectral fragmentation of the flavanone from *Lannea acida*.

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