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Short Note

Further Aporphine Alkaloids from *Phoebe lanceolata*

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Abstract: Stem bark of *Phoebe lanceolata* was extracted with ethanol and fractionated with ethyl acetate yielded soluble and insoluble fractions. Ethyl acetate insoluble fraction was subjected to column chromatography afforded two oxalyl-fused didehydroaporphine alkaloids, N-6/C-7 oxalyl-fused 2,9-dihydroxy-1,10-dimethoxy 6a,7-didehydroaporphine and N-6/C-7 oxalyl-fused 1,2,9,10-tetramethoxy 6a,7-didehydroaporphine along with well known β-sitosterol and β-sitosterol glucoside. The structures of isolated compounds were elucidated by chemical and spectral analysis.

Keywords: *Phoebe lanceolata*, Lauraceae, aporphine alkaloid, laurodionine

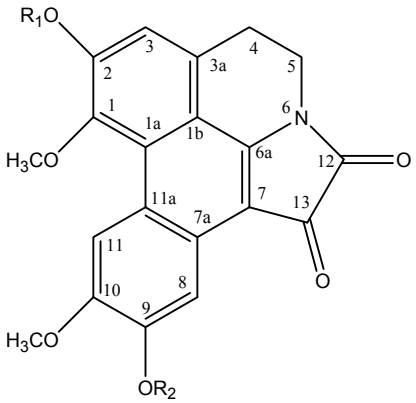
1. Introduction

Phoebe lanceolata belonging to family Lauraceae is an evergreen tree and well reputed in traditional medicine in India [1]. Ethanolic extract of the stem bark showed antidiabetic, antibacterial and antifungal activity (preliminary work done by us at different laboratory). We recently reported an aporphine alkaloid, nordelporphine [2] from this source and now outlined the isolation and characterization of two oxalyl-fused didehydroaporphine alkaloids.

2. Results and discussion

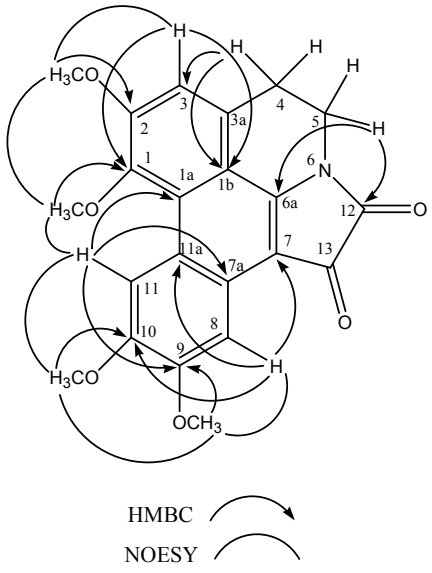
Compound **1** was isolated as black crystals, m.p. 280-283^{0}C (uncorr.) deduced the molecular formula $C_{20}H_{15}NO_6$ from the molecular ion at m/z 365.7 in the LC-EIMS (positive mode). This compound was elucidated as N-6/C-7 oxalyl-fused 2,9-dihydroxy-1,10-dimethoxy 6a,7-didehydroaporphine by direct comparison (UV, IR and NMR) to published data for laurodionine [3] isolated from *P. formosana.* Compound **2** was isolated as black-brown crystals, m.p. 205^{0}C deduced the molecular formula $C_{22}H_{19}O_6N$ from the molecular ion at m/z 393.3 in the EIMS. The IR absorptions at υ_{max}^{KBr} 1734 cm^{-1} was characteristic for carbonyl function. ^{1}H NMR spectrum revealed the presence of four methoxy (δ 3.92, 3.63, 3.76 and 3.85) and three aromatic protons (δ 7.81, 7.12 and 6.73).

Figure 1. Chemical structures of compound **1** and **2**.



	R_1	R_2
1	H	H
2	CH_3	CH_3

Figure 2. Important HMBC and NOESY correlations of compound **2**.



^{13}C NMR spectrum expressed the evidence for two carbonyl groups (δ 163.83 and 173.33). DEPT (135^0) showed the presence of four CH_3, two CH_2, three CH and thirteen quaternary carbons. HMBC and NOESY correlations are shown in Fig. 2. These data were somewhat similar to that of **1** except the presence of two methoxy groups instead hydroxy groups. On methylation [4], compound **1** afforded black brown product identical to **2** indicated that the locations of methoxy groups in **2** were similar to those of hydroxy groups in **1**. The HMBC correlation of OCH_3-1 (δ 3.92) to C-1 (δ 144.54), OCH_3-2 (δ 3.63) to C-2 (δ 159.28), OCH_3-9 (δ 3.76) to C-9 (δ 152.23) and OCH_3-10 (δ 3.85) to C-10 (δ 148.77) whereas the NOESY correlation of OCH_3-1 to OCH_3-2 and H-11 (δ 7.81); OCH_3-2 to OCH_3-1 and H-3 (δ 7.12); OCH_3-9 to OCH_3-10 and H-8 (δ 6.73) and OCH_3-10 to OCH_3-9 and H-11 were further confirmed the position of all methoxy groups. EIMS (positive mode) revealed a molecular ion at m/z 393, another ion at m/z 377 (loss of CH_4) and the most abundant ion $[C_{16}H_5NO_4]^{\bullet+}$ at m/z 275 was due to loss of $C_5H_{10}O_2$. On the basis of these findings and the proposed structure described by Castedo *et al.*, [5], the compound **2** was characterized as N-6/C-7 oxalyl-fused 1,2,9,10-tetramethoxy 6a,7-didehydroaporphine.

3. Experimental

3.1. General

Melting points were determined on Perfit melting point apparatus; UV spectra on Perkin-Elmer, Lambda- 25 spectrophotometer in MeOH; IR spectra on Perkin-Elmer, Spectrum RX I FT-IR spectrophotometer (KBr discs); NMR spectra on JEOL NMR spectrophotometer (300 MHz for ^1H and 125 MHz for ^{13}C in DMSO, TMS as internal standard); LC-EIMS on Finnigan MAT spectrophotometer. Preparative TLC (0.5 mm thick layer) was carried out on silica gel (Merck 10-40 μ) spots were detected using UV at 254 and 365 nm and Dragendorff's reagent.

3.2. Plant material

Stem bark (6 kg) of *P. lanceolata* was collected from Kartikswami temple, Dist. Chamoli (Uttarakhand) and identified by Prof. R.D. Gaur, Department of Botany, H.N.B. Garhwal University Srinagar. A voucher specimen (GUH-17598) of the plant was deposited in the Departmental Herbarium.

3.3. Extraction and isolation

Coarsely powdered stem bark (2 kg) was extracted twice with 95% ethanol (5L) at 50^0C (15 hours) on a heating mantle. After removal of the solvent under reduced pressure, the residue (230 g) was fractionated with EtOAc (repeated 3-4 times) yielded soluble and insoluble portions. The insoluble portion (120 g) was pre-adsorbed onto silica gel (50 g) and subjected to column chromatography over silica gel (500 g, Merck, 60-120 mesh). The elution was perform first with $CHCl_3$ and then with $CHCl_3$ containing increasing amount of MeOH. The fractions obtained were collected every 50 ml. The elution with $CHCl_3$–MeOH (47:3→9:1) afforded twelve fractions of 250 ml. These fractions were

combined on the basis TLC analysis and subjected to preparative TLC in $CHCl_3$–MeOH (8:2) afforded compounds **1** (23 mg) and **2** (20 mg), purified by recrystallised with $CHCl_3$–MeOH (1:1).

*3.5. N-6/C-7 oxalyl-fused 1,2,9,10-tetramethoxy 6a,7-didehydroaporphine (**2**)*

Black-brown crystals ($CHCl_3$/MeOH); m.p. 205-207^{0}C; $[\alpha]_D^{20}$: +47^0 (c 0.3, MeOH); M.F. $C_{22}H_{19}NO_6$, UV λ_{max}^{MeOH}: 206, 268, 434 nm; IR υ_{max}^{KBr}: 2956, 1734, 1662, 1554, 1471 cm^{-1}. ^{1}H, ^{13}C, HMBC and NOESY NMR data: see Table-1; LCMS: 393 $[M]^+$, 377 $[C_{21}H_{15}NO_6]^{\bullet+}$, 275 $[C_{16}H_5NO_4]^{\bullet+}$, 148 $[C_8H_6NO_2]^+$; Elemental analysis: (found C- 67.24%, H- 04.84%, N- 03.56 and O- 24.46%; calculated for $C_{22}H_{19}NO_6$ C- 67.17%, H- 04.87%, N- 03.56 and O- 24.40%).

Table 1. ^{13}C and ^{1}H NMR data of **2** in DMSO d^6

Position	δ_C ppm	δ_H ppm (*J* Hz)	DEPT	NOESY	HMBC
1	144.54	-	C		
1a	126.20	-	C		
1b	127.95	-	C		
2	159.28	-	C		
3	114.56	7.12 s	CH	3.63	127.95, 144.54
3a	133.82	-	C		
4	25.87	2.85 t (3.8)	CH_2	3.18	114.56, 127.95
5	36.88	3.18 t (3.8)	CH_2	2.85	151.47, 163.83
6a	151.47	-	C		
7	102.42	-	C		
7a	124.76	-	C		
8	104.06	6.73 s	CH	3.76	102.42, 115.83, 148.77
9	152.23	-	C		
10	148.77	-	C		
11	108.63	7.81 s	CH	3.85, 3.92	124.76, 126.20, 152.23
11a	115.83	-	C		
12	163.83	-	C		
13	173.33	-	C		
OCH_3-1	58.85	3.92 s	CH_3	3.63, 7.81	144.54
OCH_3-2	58.11	3.63 s	CH_3	3.92, 7.12	159.28
OCH_3-9	56.36	3.76 s	CH_3	3.85, 6.73	152.23
OCH_3-10	55.47	3.85 s	CH_3	3.76, 7.81	148.77

*3.6. Methylation of compound **1***

Dimethyl sulfate (1.5 mg) and dry potassium carbonate (1.5 mg) were added to compound **1** (5 mg) in 5 ml of acetone. The mixture was stirred vigorously and refluxed for 30 minutes in round bottom

flask on water bath. The concentrated filtrate afforded methylated product, M.P. 205-206^{0}C as a black brown compound.

Acknowledgements

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