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STRUCTURE OF A NEW BISBENZYLISOQUINOLINE ALKALOID, LINDOLDHAMINE[1)]

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The structure of lindoldhamine, isolated from the leaves of Lindera oldhamii Hemsl.(Lauraceae), has been established as (1), by spectral data and chemical degradations.

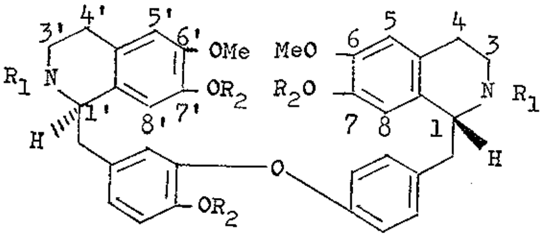
In the previous paper[1)], we have reported that an unknown alkaloid with mp 173-176° has been separated from the leaves of Lindera oldhamii Hemsl.(Lauraceae). This substance is a bisbenzylisoquinoline alkaloid, named lindoldhamine(1), with $C_{34}H_{36}N_2O_6$, colorless fine needles, mp 183-186°, $[\alpha]_D^{33}$ +35°(c=1.0, EtOH), λ_{max}^{EtOH} 205, 220 sh, and 280 nm(logε 4.65, 4.39, and 3.91), m/e 568(M^+), 178(base peak), when it was chromatographed on neutral alumina using methanol as eluent and recrystallized from a mixture of EtOH, Me_2CO and $CHCl_3$. The nmr spectrum δ (CF_3COOH) showed two methoxyl groups at 3.98(6H, s.) and complicated signal due to eleven aromatic protons at 6.79-7.54 region.

In the nmr spectrum δ ($CDCl_3$) of N,N-dimethyllindoldhamine (2) with $[\alpha]_D^{21}$ -85°(c=0.65, $CHCl_3$) afforded by treating 1 with formalin and $NaBH_4$, the chemical shifts of two N-methyl groups at 2.42(3H, s) and 2.47(3H, s), two methoxyl groups at 3.80(6H, s), the eleven aromatic protons at 6.22-7.09 region, and three phenolic hydroxyl groups at 5.58(3H, broad s), respectively, suggested a bisbenzyltetrahydroisoquinoline alkaloid with one "tail to tail" diphenyl ether linkage$^{2)}$.

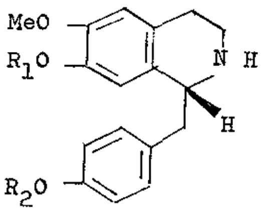
Permanganate oxidation of N,N,O,O,O-pentaethyllindoldhamine (3) diethobromide, yielded by treating lindoldhamine(1) with ethanolic KOH and EtBr, furnished 4-ethoxy-3,4'-oxydibenzoic acid (4) as colorless sands, mp 273-275°.

Cleavage reaction of the diphenyl ether linkage of O,O,O-trimethyllindoldhamine(5), prepared by methylation of 1 with diazomethane, with sodium in liquid NH_3 afforded R-(-)-N-nor-O-methylarmepavine$^{3)}$(6), whose oxalate was colorless needles with mp 214-215°(swelling), $[\alpha]_D^{31}$ -38°(c=0.9, MeOH), which was identified by direct comparison with the sample obtained by methylation of R-(+)-N-norarmepavine$^{4)}$(7) with diazomethane, as non-phenolic base part, and R-(+)-N-norarmepavine$^{4)}$(7) as colorless needles, mp 152-153°, $[\alpha]_D^{32}$ +22°(c=1.0, $CHCl_3$) as phenolic base part. Cleavage reaction of the diphenyl ether linkage of O,O,O-triethyllindoldhamine(8), prepared by ethylation of 1 with diazoethane, with sodium in liquid NH_3 gave R-O,O-diethylcoclaurine(9), whose oxalate was colorless fine needles with mp 224-225° (swelling), which was identified by direct comparison with the sample prepared by ethylation of dl-coclaurine5) with diazoethane, as non-phenolic base part, and R-7-O-ethylcoclaurine(10) as colorless prisms, mp 142-143°, nmr δ (CDCl$_3$): 1.42(3H, t, J=7Hz, OCH$_2$C$\underline{H_3}$), 3.82(3H, s, OCH$_3$), 4.04(2H, AB q, J_1=7Hz, J_2=14Hz, OC$\underline{H_2}$CH$_3$), 4.52(2H, broad s, OH and NH), 6.56, 6.66(each 1H, each s, ArH), 6.59, 6.98(each 2H, each d, J=8Hz, ArH), whose ethylation sample formed by treating of 10 with diazoethane was identical with 9, as phenolic base part.

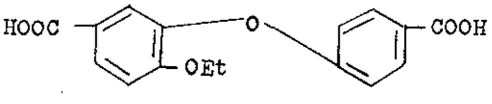
Therefore, the structure of lindoldhamine has been offered as (1).



(1) R_1=R_2=H
(2) R_1=Me, R_2=H
(3) R_1=R_2=Et
(5) R_1=H, R_2=Me
(8) R_1=H, R_2=Et



(6) R_1=R_2=Me
(7) R_1=Me, R_2=H
(9) R_1=R_2=Et
(10) R_1=Et, R_2=H



(4)

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