GOMALINE — A NEW INDOLENINE ALKALOID FROM *CATHARANTHUS ROSEUS*

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Abstract — A new indolenine alkaloid, gomaline, has been isolated from the leaves of *Catharanthus roseus* to which structure (1) has been assigned.

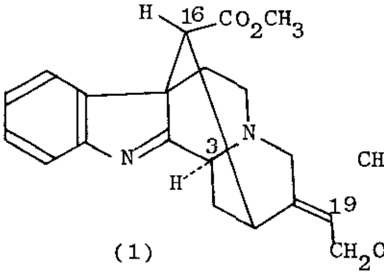
Catharanthus roseus is one of the most throughly investigated plants of the Apocynaceae family. Previous investigations have resulted in the isolation of over 90 alkaloids of different types. Earlier investigations on the plant have resulted in the isolation of picraline-type alkaloids,[1,2] from this plant. We now report a new alkaloid, "gomaline" (1) from the leaves of *C.roseus*.

Extraction of crude alkaloids from the leaves was carried out in the usual manner.[3,4] The crude alkaloids were subjected to selective precipitation and extraction with pH-2 phosphate buffer solution. The solution was extracted with chloroform, the pH of the aqueous solution was increased to pH-10, and the solution again extracted with chloroform. The chloroform extracts were dried, concentrated and flash chromatographed through an alumina column, elution being carried out with ethyl acetate. The ethyl acetate fraction was concentrated and again loaded on another flash chromatography column packed with t.l.c. grade silica. The column was eluted with ethyl acetate, ethyl acetate-methanol and finally with methanol. The methanolic fraction was subjected to preparative t.l.c. on alumina (acetone-petroleum ether, 75:25) to afford a new alkaloid "gomaline" as a colourless amorphous material, $|\alpha|_D = +94^\circ$ ($CHCl_3$).

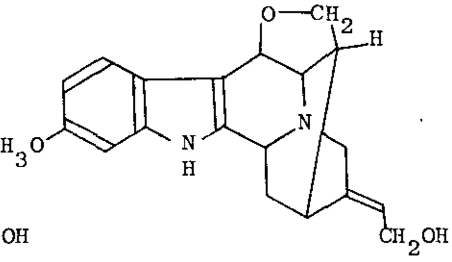
Gomaline exhibited a typical indolenine UV spectrum which showed absorptions at λ_{max}(MeOH) 210 and 262 nm. The IR spectrum ($CHCl_3$) showed the presence of an ester carbonyl absorption at 1725 cm^{-1} which an absorption at 3400 cm^{-1} was consistent with the presence of an OH group. The H-NMR spectrum showed a one-proton triplet at δ 5.57 (J=7Hz) for an olefinic proton while a two proton doublet at δ 3.94 (J=7Hz) was assigned to hydroxymethylene protons at α position to the olefinic carbon atom. These signals suggested the presence of the group $HOCH_2$-CH=C- in the molecule. This was confirmed by double resonance experiments. Irradiation of the triplet at δ 5.57 resulted in the collapse of the doublet at δ 3.94. A three proton singlet at δ 3.79 was assigned to the ester methyl group. A doublet at δ 4.68 (J=4.8Hz) was assigned to the C-3 proton.[5-7] The assignments were further supported by correlating these data with those reported for hydroxygardnutine (2).[8]

The mass spectrum of gomaline (1) bore a distinct resemblance to that of strictamine (3)[7] showing the molecular ion peak M^+ at m/z = 338.1618 (calcd. for $C_{20}H_{22}N_2O_3$, 338.1630) with other major peaks at 321 (20%), 279 (40%), 261 (15%), 232 (10%), 206 (10%), 180 (20%) and 115 (15%).

The stereochemistry at C-16 emerges from the fact that in the opposite configuration at this centre the proximity with the ketimine group of indolenine system causes an upfield shift of the ester methyl to $\sim \delta$ 3.16.[5-7] The stereochemical disposition at C-19 cannot be defined with any certainty, but in view of our earlier establishment of the structure and absolute configuration of the picralima group of bases,[5-7] it is tentatively proposed to be as shown in (1). On the basis of these data, structure (1) is assigned to gomaline.



(1)



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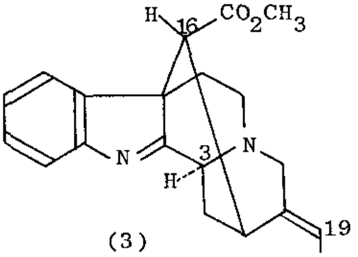

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