

Pericyclivine, a New  
*Catharanthus* Alkaloid

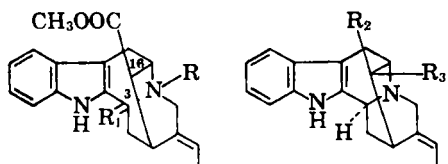
Sir:

In the course of the structure elucidation of perivine (I) (1), a major alkaloid of *Catharanthus roseus* and *C. lanceus* (2), the authors had occasion to convert I to the hitherto unknown pentacyclic deoxy compound II. The isolation of an alkaloid, pericyclivine, identical to substance II from the leaves of *C. lanceus*, is now reported.

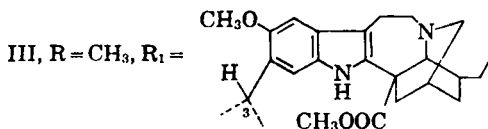
Of the six classified *Catharanthus* species, only the two mentioned above have been phytochemically enumerated to date (3). Several identical alkaloids appear to be present in both species, *i.e.*, perivine and leurosine (2). Perivine (I) is a 2-acyl indole-containing compound; as such, it is capable in its reduced form of readily forming dimeric substances through condensation with activated aromatic rings (1). The alkaloid voacamine (III) is an example of such a condensation product (4). No natural dimer of this type has been found in the genus *Catharanthus* as yet.

afforded 0.225 Gm. of pericyclivine ( $C_{20}H_{22}N_2O_2$ ), m.p. 232–233°, monoclinic prisms with elongation parallel to the *b* axis,  $pK'a$  6.75 (33% DMF),  $[\alpha]_D^{25} + 5.2$  ( $c=1.0$ ,  $CHCl_3$ ), which was shown to be identical to II, prepared from perivine (1), by comparison of I.R. and NMR spectra and mixed melting points (1). An examination of the NMR spectrum of pericyclivine indicated that the ester function ( $CH_3$  singlet 3.05  $\delta$ ) at C-16 was oriented toward the indole moiety as shown in II. Treatment of the base with sodium methoxide in methanol resulted in epimerization of the ester-methyl (3.78  $\delta$ ) to yield the known dehydroxymethyl akuammidine<sup>1</sup> (IV) (6).

A number of indole alkaloids containing the pericyclivine ring system are known (7). Of particular interest is the occurrence of both ester-carbinol isomers in akuammidine (V) and polynneuridine (VI) and also the 16-carbinol, normacusine-B (VII). This represents the first example of an alkaloid in this series containing only an ester function at C-16. The finding of this alkaloid, an obvious progeny of perivine, indicates that perivine or its biosynthetic equivalent must exist in *C. lanceus*. It will be interesting to see if dimeric compounds containing perivine will eventually be discovered in this plant.



- I, R = H, R<sub>1</sub> = O II, R<sub>2</sub> = COOCH<sub>3</sub>, R<sub>3</sub> = H  
 IV, R<sub>2</sub> = H, R<sub>3</sub> = COOCH<sub>3</sub>  
 V, R<sub>2</sub> = COOCH<sub>3</sub>, R<sub>3</sub> = CH<sub>2</sub>OH  
 VI, R<sub>2</sub> = CH<sub>2</sub>OH, R<sub>3</sub> = COOCH<sub>3</sub>  
 VII, R<sub>2</sub> = H, R<sub>3</sub> = CH<sub>2</sub>OH



Following the procedure utilized for *C. roseus* (5), the A fraction from *C. lanceus* leaf (100 Gm.) was chromatographed on alumina (partially deactivated, Alcoa F-20). After elution of perivine, leurosine, and yohimbine, crude pericyclivine was obtained from the chloroform-benzene(2:1) eluates. Two crystallizations from ethanol

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<sup>1</sup> The logical name of pericyclivine should be dehydroxymethyl akuammidine since the ester function in akuammidine (V) is oriented as shown for the former compound (II). However, treatment of akuammidine with potassium *tert*-butoxide yields compound IV isomerized at position 16. Therefore, to avoid confusion we have chosen the trivial name "pericyclivine."