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Corrado Galeffi, Marcello Nicoletti, Irene Messana, Giovanni Battista Marini-Bettòlo

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Chimica. — Asiatic Strychnos: *Structure of 15–hydroxystrychnine from* S. nux vomica *L.* Nota di CORRADO GALEFFI (*), MARCELLO NICOLETTI (**), IRENE MESSANA (**) e GIOVANNI BATTISTA MARINI–BETTÒLO (**), presentata (***) dal Corrisp. G. B. MARINI–BETTÒLO.

RIASSUNTO. — Dai semi di *S. nux vomica* L. (Loganiaceae) è stato isolato un nuovo alcaloide al quale è stata attribuita la struttura di 15–idrossistricnina in base ai dati spettroscopici dello stesso alcaloide e di quelli del suo O–acetilderivato. Questo è il primo esempio di un alcaloide della serie stricnina sostituito in 15.

Strychnos nux vomica L., a South East Asian species, has been known for centuries for its biological activity, both as arrow poison and as a medicament. It was also one of the first plants to be studied chemically; strychnine I (Fig. 1), its main alkaloid, was isolated in 1818 by Pelletier and Caventou [1].

Since then many other alkaloids have been isolated from the plant: nine up to 1965 [2].

The use of highly selective separation techniques, i.e. ccd (counter current distribution) at discontinuously decreasing pH, proposed by us [3], made it possible to isolate from the seeds of *S. nux vomica* L. four other alkaloids.

The structure of three of them was subsequently determined [4, 5]. We now report the structure of the fourth alkaloid II, established by UV, IR, ^1H– and ^{13}C–NMR spectroscopy of the compound itself and of its O–acetyl-derivative III.

II, crystals from EtOAc, m.p. 204–6° C, $C_{21}H_{22}N_2O_3$, $[\alpha]_D^{20} = -192.7$ (c. 0.4, $CHCl_3$); MS m/e (%): 350 (M^+, 100), 333 (10), 178 (5), 144 (11), 143 (10), 130 (15); UV_{EtOH} λ_{nm} (log ε) 255 (4.08), 280 (3.60), 291 (3.49); IR_{CHCl_3} 3460 (OH) and 1660 (C = O) cm^{-1}.

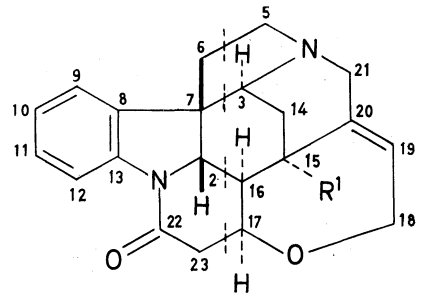
The above data indicate the close relationship between I and II, the main difference being a hydroxy group in the latter. Furthermore, the presence in the MS of II of a peak at m/e 178 ($C_{10}H_{12}NO_2^+$) corresponding to the right moiety of the molecule (Fig. 1), instead of the peak at m/e 162 in strychnine, suggests that the hydroxy group of II is in that fragment of the molecule.

The position 15 can be assigned uniquivocally to the hydroxy group on the basis of the comparison of the ^1H–NMR spectra of II and strychnine:

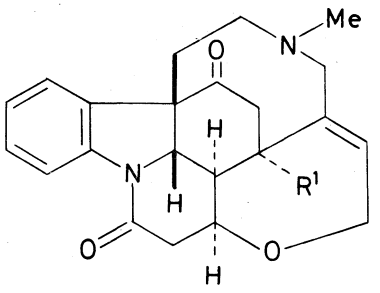
(*) Laboratorio di Chimica del Farmaco, Istituto Superiore di Sanità, Roma.

(**) Cattedra di Chimica Generale ed Inorganica, Facoltà di Scienze, Università di Roma e Centro Chimica dei Recettori e delle molecole biologicamente attive del C.N.R., Roma.

(***) Nella seduta del 16 dicembre 1978.



	R^1	
I	H	strychnine
II	OH	15–hydroxystrychnine
III	OAc	15–acetoxystrychnine



	R^1	
IV	OH	15–hydroxyicajine
V	H	icajine

(*dashed lines indicate the mass fragmentation*)

Fig. 1.

deshielding of H–17 for diaxial interaction with the hydroxy group in 15; disappearance of the coupling of H–16 with H–15, of $H–14_b$ with H–15 and of the allylic coupling of H–19 with H–15. These observations are confirmed by double irradiation experiments performed on the O–acetylderivative III, m.p. 198–201° C, $C_{23}H_{24}N_2O_4$, $[\alpha]_D^{20} = -151$ (c. 0.9, $CHCl_3$). The ^{13}C–NMR spectrum of the latter in comparison to that of strychnine confirms for II the position 15 for the hydroxy group. We can thus assign to II the structure of 15–hydroxystrychnine.

15–hydroxystrychnine is the first natural product of the strychnine series containing a hydroxy group in 15. Previously alkaloids with the same substitution were found in the N–methyl–pseudostrychnine series, i.e. 15–hydroxyicajine IV isolated with icajine V from *S. icaja* [6].

The finding of 15–hydroxystrychnine thus completes the biogenetic pattern of *S. nux vomica* alkaloids and indicates how in *Strychnos* the biogenetic routes proceed in parallel lines after the initial differentiation in the main series of strychnine, pseudostrychnine and N–methyl–pseudostrychnine.

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