

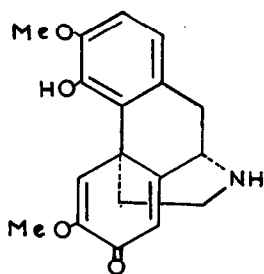
FLAVININE, A NEW MORPHINANDIENONE ALKALOID
FROM CROTON FLAVENS L.

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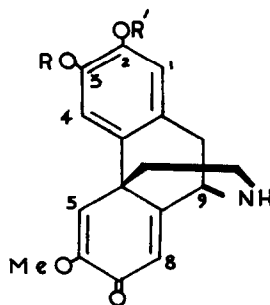
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Tartaric acid extraction of Croton flavens L. has yielded two chloroform soluble phenolic alkaloids, namely norsinoacutine (I) and flavinine (II; R = H, R' = Me or R = Me, R' = H), a new morphinandienone alkaloid.



I

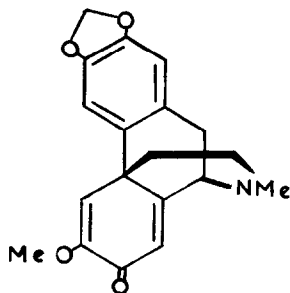


II

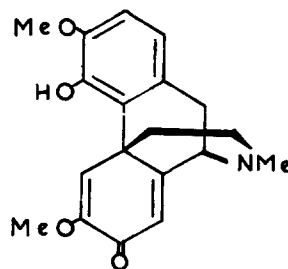
Norsinoacutine, $C_{18}H_{19}NO_4$ was recently isolated from C. balsamifera Jacq. (1) as a homogeneous but amorphous solid. This alkaloid has now been obtained crystalline, m.p. 113-115°, $[\alpha]_D^{16} - 107^\circ$ (EtOH), $\lambda_{max}^{EtOH} 241 m\mu$ (ϵ 15,500), sh. 275 $m\mu$ (ϵ 6,780), while the IR [ν_{max}^{nujol} 3215 (NH), 2604(OH), 1733(acetate), 1665, 1634, 1608(dienone) cm^{-1}], NMR spectrum and analytical data confirmed that norsinoacutine crystallised with one mole of ethyl acetate. NO-dimethylnorsinoacutine methiodide, m.p. 163-166°, crystallised with one mole of acetone.

Flavinine, $C_{18}H_{19}NO_4$, m.p. 130-132° (one mole of acetone of crystallisation), $[\alpha]_D^{16} - 6^\circ$ (EtOH), λ_{max}^{EtOH} 238 μ (ϵ 13,120) and 285 μ (ϵ 8,067), $\nu_{max}^{CHCl_3}$ (acetone removed) 3484 (OH), 2967 (NH), 1667, 1639, 1629 (dienone) and 1503 (unsubstituted C-1) cm^{-1} (2) is isomeric with norsinoacutine. It formed a NO-dimethylmethiodide derivative, m.p. 250-252° (decomp.) which is not identical with the corresponding norsinoacutine derivative. Comparison of the UV, IR, NMR data of flavinine with data from morphinandienone compounds clearly showed that flavinine is also a member of this new group of alkaloids. Table I summarises the NMR data on morphinandienone alkaloids. C₈-H in all these compounds occur between 6.28 δ and 6.40 δ in the spectra determined in $CDCl_3$. In the spectra of N-acetylflavinine and NO-diacetylflavinine, the aromatic protons are clearly separated and display no ortho or meta coupling. This therefore locates two of the oxygen containing substituents at C-2 and C-3. Consistent with this substitution pattern is the fact that the IR spectrum of flavinine has a strong band at 1503 cm^{-1} and not at 1475 cm^{-1} , supporting an unsubstituted C-1 (2). The UV data of flavinine is comparable to that reported for amurine (III) (3).

The absolute stereochemistry of flavinine was ascertained by CD examination of this alkaloid in dioxan.* The R-band cotton effect was positive, and very similar to that obtained for amurine (III) (4). Flavinine therefore has the same absolute stereochemistry as amurine and also as the morphine precursor, salutaridine (IV).



III



IV

* The CD was kindly determined by Dr. G. Snatzke.

TABLE I
NMR Spectra of Morphinanindienone Alkaloids (δ Values)

Compounds	C ₁ -H or C ₂ -H	C ₄ -H	C ₅ -H	C ₈ -H	OMe	OMe	N-Me	N-Ac	O-Ac	C ₉ -H in N-Ac comp.
Salutaridine	6.68;	-	7.56	6.32	3.74; 3.88	3.88	2.45	-	-	-
Salutaridine acetate(2)	6.89	-	6.96	6.31	3.77; 3.88 3.94;	3.88	2.46	-	2.40	-
O-methylsalutaridine(2)	6.86	-	7.30	6.33	3.80; 3.86	3.86	2.49	-	-	-
Norsinoacutine(1)	6.68;	-	7.62	6.28	3.75; 3.88	3.88	-	-	-	-
" with ethylacetate of crystallisation ^a	6.56;	-	7.63	6.15	3.62; 3.75	3.75	-	-	-	-
NO-diacetylnorsinoacutine	~ 6.93 ^c	-	6.93	6.33	3.75; 3.82	3.82	-	2.05	2.42	5.53 ^d
Amurine [*]	C ₁ -H; or 6.39	6.65 ^e	6.92	6.36 or 6.39	3.82	-	-	2.45	-	-
Flavinine ^f	C ₁ -H; or 6.70	6.64 or 6.70	6.97	6.18	3.68; 3.75	3.75	-	-	-	-
N-acetylflavinine	C ₁ -H; or 6.40	6.58	7.00	6.35 or 6.40	3.78; 3.86	3.86	-	2.09	-	5.68
NO-diacetylflavinine	C ₁ -H; or 6.33	6.73	7.10	6.33 or 6.37	3.80; 3.81	3.81	-	2.10	2.30	5.70

All the above NMR spectra were determined at 60 Mc/sec. in CDCl₃ with TMS as internal standard, unless otherwise stated.

^aSpectrum run in CD₃SOCD₃ with TMS as internal standard. The ethylacetate protons appeared at 1.18 δ (triplet), 1.99 δ and 4.05 δ (quartet). ^bAB splitting with JAB = 8 c/sec. ^cJAB = 9 c/sec. ^dProton appeared as a broad triplet. ^eMethylenedioxy protons appeared at 5.95 δ . ^fSpectrum determined in CD₃SOCD₃ and the acetone of crystallisation appeared at 2.10 δ .

*Spectrum kindly provided by Dr. W. Döpke.

Flavinine is another example of a morphinandienone alkaloid which is probably formed by the uncommon para-para oxidative coupling of a norreticuline-type precursor, and further studies have been initiated to decide between structures (II; R = H, R' = Me) and (II; R = Me, R' = H) for this alkaloid.

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