

Alkaloid Biosynthesis in Two *Croton* Species

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Summary *Croton linearis* can biosynthesise crotonosine (1) from linearisine (3): *C. flavens* oxidised dienols to dienones and also demonstrated *N*-demethylation.

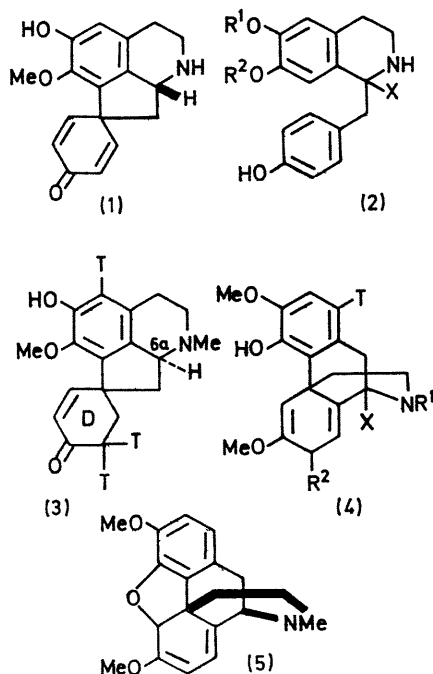
CROTONOSINE (1) can be biosynthesised from (+)-coclaurine (2; R¹ = Me, R² = H, X = -H) or (±)-norcoclaurine (2; R¹ = R² = H, X = -H)¹ and we now report that *C. linearis* Jacq. can also utilise [³H₃]linearisine (3), albeit,

less efficiently (0.01–0.03%). The labelling pattern in [³H₃]linearisine was ascertained by parallel experiments in which linearisine (100 mg) was heated with D₂O (1 ml) in dimethylformamide (2 ml) under nitrogen for 72 h. The product was then purified on an alumina column and the optical activity redetermined. Examination by n.m.r. and mass spectrometry proved the location of the deuterium atoms. The observed C-6a inversion suggests the intermediacy of an imine or enamine,² and is of interest in view of the earlier lack of incorporation of (–)-coclaurine (2; R¹ = Me, R² = H, X = -H).¹ *N*-Demethylation as well as the oxidation of ring D of linearisine are also prerequisites for the observed incorporation.

In another series of wick-feeding experiments with *C. flavens* L. plants, it was shown that norsinoacutine (0.2%) and sinoacutine (0.01%) were interconvertible by feeding [³H₁]sinoacutine (4; R¹ = Me, R² = -O, X = -H)³ and [³H₁]norsinoacutine (4; R¹ = H, R² = -O, X = -H).[†] Reticuline showed a 0.002% incorporation into sinoacutine,⁵ and [³H₁]norsinoacutinols (4; R¹ = H, R² = -OH, X = -H) were transformed by this plant into norsinoacutine (0.002%) and sinoacutine (0.001%). *Papaver somniferum* plants can dehydrate [³H₁]salutaridinol-I (4; R¹ = Me, R² = -OH, X = -H) to thebaine (5),⁶ but biosynthetic experiments with both *C. flavens* and *Sinomenium acutum*³ plants suggest that some plants which contain the appropriate morphinandienone compounds, but do not produce morphine-type alkaloids can suppress the necessary dehydration step by reconverting dienols into dienones.

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[†] *N*-Demethylations have been observed previously in only a few alkaloid cases.⁴

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