(−)-Amuronine from the leaves of *Croton flavens* L. (Euphorbiaceae)

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Received 26 February 1999; received in revised form 10 September 1999; accepted 1 November 1999

**Keywords:** *Croton flavens*; Euphorbiaceae; Proaporphinic alkaloids; (−)-Amuronine

1. Subject and source

*Croton flavens* L. (Euphorbiaceae) is a small tree, found throughout the Caribbean coast of Colombia. The leaves were collected in Santo Tomás de Villanueva, Colombia, in January 1997. The plant was identified by Dr. Edunio Carbonó de la Hoz. A voucher specimen, No. SC1093, was deposited in the Herbarium of the Pharmacognosy Department, Universidad Tecnológica del Magdalena, Santa Marta, Colombia.

2. Previous work

Previous studies have reported that species of *Croton* produce alkaloids of the aporphine, proaporphine and morphinandienone groups (Farnsworth et al., 1969; Southon and Buckingham, 1989) and N-methyltyramine derivatives (Stuart and Byfield, 1971).

The presence of an alkaloid fraction in the leaves of *Croton flavens* was revealed by general screening methods (Caro, 1998). Proaporphirine alkaloids have been reported...

3. **Present study**

The air-dried and powdered leaves (1000 g) were extracted for 72 h with EtOH at room temperature. The crude extract (70 g) was taken up in 5% HCl and filtered. The filtrate was basified with NH$_4$OH and extracted with CHCl$_3$. Evaporation of the solvent yielded a crude alkaloidal extract (2 g). A preliminary separation of the alkaloids was carried out using a silica-gel (40–140 mesh, J.T. Baker) column (40 × 2.5 cm), using CH$_2$Cl$_2$, gradually enriched with acetone as eluent. Fractions displaying similar alkaloidal composition on silica-gel tlc glass plates were combined and subjected to a second chromatographic separation on a silica-gel (40–140 mesh, J.T. Baker) column (25 × 1.5 cm) using CH$_2$Cl$_2$-MeOH (1 : 1 v/v). Final purification of (−)-amuronine (11.8 mg) was achieved by preparative tlc on silica-gel glass plates. The identification of (−)-amuronine was supported by the IR (1667, 1619 cm$^{-1}$) and UV (243 nm) spectra indicating the presence of $\alpha$, $\beta$-unsaturated carbonyl moiety which is found in some proaporphines. Chemical shifts assignments were determined by the analysis of $^1$H NMR, $^{13}$C NMR, DEPT 135°, HETCOR and $^1$H-$^1$H COSY 45° data, and NOE studies. Reciprocal NOEs could be detected between H-8 (δ 6.90) and H-6a (δ 3.29), H-8 to H-6a (5%) and H-6a to H-8 (7%), pointing to a syn relationship between these hydrogens. The above results were confirmed by comparison with the chemical shifts reported for known proaporphines (Gözler et al., 1987; Gözler, 1990; Guinaudeau et al., 1987; Mukhtar et al., 1997) (Fig. 1).

4. **Chemotaxonomic significance**

This is the first report on the occurrence of (−)-amuronine in *Croton flavens*. To date proaporphinic alkaloids have been isolated from the following families and

![Diagram of (−)-amuronine](image)

Acknowledgements

We thank the IIF, CDCH-UCV, CYTED for their financial support and CONICIT grant No LAB-97000665 and the technical assistance of Mr. Rafael Paredes.

References