

## PHYTOCHEMICAL REPORTS

### INGENOL FROM *EUPHORBIA DESMONDI*

F. J. EVANS and A. D. KINGHORN

Department of Pharmacognosy, The School of Pharmacy (University of London),  
29/39, Brunswick Square, London WC1N 1AX, England

(Received 1 November 1973. Accepted 12 November 1973)

**Key Word Index**—*Euphorbia desmondi*; Euphorbiaceae; diterpene; ingenol.

A new class of polyhydroxy diterpenes<sup>1-3</sup> have been isolated from the latex of several *Euphorbia* species. Their respective esters have an irritant and co-carcinogenic action on the skin of mice.<sup>4</sup>

*Plant.* *Euphorbia desmondi* latex collected in Ghana and Nigeria, directly into MeOH and preserved with toluene for transportation.

*Present work.* The latex was extracted and subjected to counter current distribution<sup>3</sup> and the biologically active fractions<sup>3</sup> hydrolysed with KOH in MeOH. The parent alcohol ( $M^+$  at  $m/e$  348;  $C_{20}H_{28}O_5$ ) was acetylated<sup>5</sup> and purified by preparative TLC on silica gel G firstly with  $C_6H_6$ -hexane- $Et_2O$ - $Et_2OAc$  (20 : 40 : 15 : 30) and then with  $C_6H_6$ -hexane- $Et_2O$  (1 : 1 : 2) as solvents. Ingenol triacetate was visible as fluorescent band under UV. The recovered solid was recrystallized from MeOH m.p. 195–197, chromatographically pure by TLC<sup>5</sup> and GLC.<sup>6</sup> The high resolution MS was obtained on an AEI 902 instrument; parent ion  $m/e$  474  $C_{26}H_{34}O_8$ ; fragment ions at  $m/e$  414 (M-60); 401; 372 (M-60 + 42); 354 (M-120); 341; 336 (M-120 + 18); 326; 312 (M-120 + 42) 294 (M-180); 284; 251; 223; 135; 122; 121; 97 and 83 (base peak). Infra red KBr discs 3430, 1740, 1705, 1640  $cm^{-1}$ . NMR  $CDCl_3$  (tetramethylsilane  $\delta$  = 0.00 ppm) 6.28 (H-7d); 6.09 (H-1S); 5.36 (H-5S); 4.93 (H-3S); 4.51, 4.08 ( $H_2$ -20); 4.27 (H-8d); 3.22 (1 OH deuterium exchange); 2.21, 2.12, 2.0 ( $3CH_3CO$ ); 1.78 ( $H_3$ -19); 1.05–1.10 (3Me) ppm, CD 202 nm  $[\theta]$  = +21 780; 210 nm  $[\theta]$  = +5148; 224 nm  $[\theta]$  = –20 064; 300 nm  $[\theta]$  = +3003 solvent MeOH. By means of GLC the ingenol content of the latex was estimated as 0.47%.

*Acknowledgements*—We are indebted to Professor D. Santra for collecting samples of latex.

<sup>1</sup> UEMURA, D. and HIRATA, Y. (1971) *Tetrahedron Letters* **39**, 3673.

<sup>2</sup> HECKER, E. (1971) *Pharmacognosy and Phytochemistry*. First International Congress, Munich (1970), p. 147, Springer, Berlin.

<sup>3</sup> HECKER, E. (1968) *Cancer Res.* **28**, 2338.

<sup>4</sup> ROE, F. J. C. and PEIRCE, W. F. H. (1961) *Cancer Res.* **21**, 338.

<sup>5</sup> EVANS, F. J. and KINGHORN, A. D. (1973) *J. Chromatog.* **87**, 443.

<sup>6</sup> EVANS, F. J. and KINGHORN, A. D. (1973) *J. Pharm. Pharmac.* **25**, 145P.