$CHMe_2]^+$ (14), 159 $[202 - CHMe_2]^+$ (30), 119 (41), 109 (62), 91 (51), 69 (80), 55 (100); CI (iso-butane): 237 $[M + 1]^+$ (7), 219 $[237 - H_2O]^+$ (3), 203 $[237 - H_2O_2]^+$ (100).

$$[\alpha]^{\lambda}_{24^\circ} = \frac{589 \quad 578 \quad 546 \quad 436\,\mathrm{nm}}{-38 \quad -40 \quad -46 \quad -80}\ (\mathrm{CHCl_3};\ c\,0.1).$$

To 3 mg **6** in 0.5 ml $CDCl_3$ 10 mg triphenylphosphine was added. After 5 min the ^1H NMR spectrum was identical with that of **7**.

Acknowledgements—We thank Dr. B. de Winter and Miss M. Welman, Botanic Research Institute, Pretoria, for their help during plant collection and identification of the plant material and the Deutsche Forschungsgemeinschaft for financial support.

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Phytochemistry, Vol. 21, No. 10, pp. 2597–2598, 1982.
Printed in Great Britain.
0031-9422/82/102597-02$03.00/0

TEUPOLIN III, A FURANOID DITERPENE FROM *TEUCRIUM POLIUM*

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(*Received* 12 *February* 1982)

Key Word Index—*Teucrium polium* var. *polium*; Lamiaceae; teupolin III; furanoid diterpene; clerodane.

Abstract—A new clerodane derivative was isolated from *Teucrium polium* var. *polium*. The structure and stereochemistry have been established by detailed studies of the ^1H NMR spectra.

We have previously described some clerodane and nor-clerodane derivatives from *Teucrium polium* var. *polium* [1]. In a continuation of this work we have isolated from the same plant a new clerodane diterpene, teupolin III (**1**). The IR spectrum of **1** contained two strong bands for a primary and a tertiary alcohol (1050, 1150, 3420 cm^{-1}), a furan ring (3130, 1600, 1505, 870 cm^{-1}), and a strong band for a carbonyl group (1700 cm^{-1}).

The ^1H NMR spectrum (Table 1) showed two AB*q* (δ 3.70, 3.78 and 3.90, 4.60) which we have assigned to H-19 and H-18. The double doublet at δ 5.13 and the singlet at 5.20 were assigned to H-12 and H-20, respectively. The proton of the hydroxyl group at C-4 appeared as a singlet at δ 3.88 (hydrogen bond of OH-4 with 6-keto).

^1H NMR spin decoupling studies were particularly informative. A double doublet (δ 3.70) which we have assigned to H-19β, was coupled to a single-proton resonance at δ 1.97 ($^4J_{10\beta,19\alpha} = 1$ Hz). A double dou-

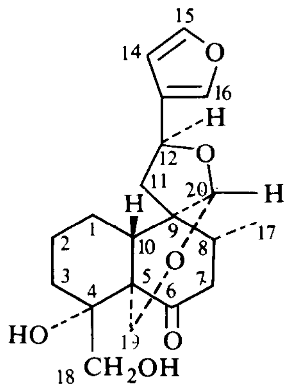

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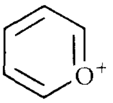
Table 1. ^{1}H NMR spectral data of teupolin III (400 MHz, TMS as internal standard)

	$CDCl_3$	$CDCl_3$–C_6D_6
H-1α	2.21 *dddd*	1.99 *dddd*
H-1′β	2.02 *dddd*	1.63 *dddd*
H-2α	1.81 *ddddd*	1.56 *ddddd*
H-2′β	1.30 *ddddd*	1.06 *ddddd*
H-3α	1.52 *dddd*	1.41 *dddd*
H-3′β	2.26 *br d*	2.10 *br d*
H-7α	2.72 *dd*	2.38 *dd*
H-7′β	2.39 *dd*	2.13 *dd*
H-8β	2.18 *m*	1.75 *ddq*
H-10β	1.97 *br dd*	1.51 *br dd*
H-11α	2.28 *dd*	1.94 *dd*
H-11′β	2.14 *dd*	1.88 *dd*
H-12	5.13 *dd*	4.95 *dd*
H-14	6.37 *dd*	4.26 *dd*
H-15	7.41 *d*	7.29 *dd*
H-16		6.74 *s*
H_3-17	1.03 *d*	0.76 *d*
H-18α	4.60 *d*	4.49 *d*
H-18′β	3.90 *dd*	3.79 *dd*
H-19α	3.78 *d*	3.58 *dd*
H-19′β	3.70 *dd*	3.52 *d*
H-20	5.20 *s*	5.03 *s*
OH	3.88 *s*	3.85 *s*

J (Hz): 1, 1′ = 1, 2′ = 2, 2′ = 2′, 3 = 3, 3′ = 14; 1, 2 = 1′, 2 = 1′, 2′ = 1′, 10 = 2, 3 = 2, 3′ = 2′, 3′ = 4; 1, 10 = 13; 3, 18 = 0.5; 7, 7′ = 19; 7, 8 = 8; 7, 8′ = 10; 8, 17 = 6.5; 10, 19 = 1; 11, 11′ = 19; 11, 12 = 11′, 12 = 8; 18, 18′ = 19, 19′ = 12.

blet (δ 3.90), which was assigned to H-18β, was coupled to H-3α ($^4J_{3\alpha,18\beta}$ = 0.5 Hz). All assignments were established by spin decoupling.

The structure assigned to teupolin III was also supported by the mass spectrum. The fragmentation of the molecular ion (*m*/*z* 362) gave an ion at 344 $[M-H_2O]^+$. The base peak at *m*/*z* 94 was assigned to the ion $C_6H_6O^+$ and the peak at *m*/*z* 81 to the ion:



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EXPERIMENTAL

Dried areial plant parts (5 kg) were extracted with Me_2CO and after evaporation the residue was treated as in ref. [2]. The $CHCl_3$ extract (40 g) was passed through a Si gel column. Elution with petrol–$CHCl_3$ (9:1) gave crude crystals (48 mg), which were recrystallized from Et_2O–Me_2CO to yield pure teupolin III, mp 178–180°, $[\alpha]_D^{28}$ − 57.1° (Me_2CO; *c* 0.154). IR ν_{max}^{KBr} cm^{-1}: 1700 (ketone), 1600, 1500 and 872 (furan ring), 3420, 1150 and 1050 (hydroxyl groups). MS (70 eV) *m*/*z* (rel. int.): 362 $[M]^+$ (5), $C_{20}H_{26}O_6$; 344 $[M-H_2O]^+$ (15), 94 (100), 81 (40), 91 (30).

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