Phytochemistry, 1974, Vol. 13, pp. 754 to 755. Pergamon Press. Printed in England.

TERPENOIDS OF *TEUCRIUM CUBENSE**

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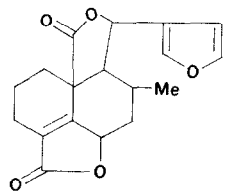
(*Received* 3 *September* 1973. *Accepted* 20 *September* 1973)

Key Word Index—*Teucrium cubense*; Labiatae; *nor*-diterpene dilactone; eugarzasadone; triacontane, clerosterol.

Plant. Teucrium cubense, collected in Apodaca, N.L. June 1970, voucher specimen 7301. *Uses.* Medicinal, stomach ache, amoebacide. *Previous work.* Only on related species.[1,2]

Present work. Besides the common triacontane and the rare clerosterol, eugarzasadone (**1**) a *nor*-diterpene dilactone was found in the light petroleum extract of *T. cubense*. Eugarzasadone showed *in vitro* very potent amoebicide activity.[3]



(**1**)

The dried and grounded aeral part of *T. cubense* (928 g) was extracted with petrol. The precipitate present on extract was collected (0·600 g) and the petrol. was evaporated leaving 11·5 g of greenish viscous paste which was saponified with KOH–MeOH for 8 hr. The precipitate was recrystalized 3 × from MeOH-acetone giving the cream plates of eugarzasadone (TLC, single spot), m.p. 188–190° a Chl. soln gave $[\alpha]_{589}$ + 165°; $[\alpha]_{578}$ + 173·4°; $[\alpha]_{546}$ + 200·1°; $[\alpha]_{436}$ + 370·6°; $[\alpha]_{365}$ + 656·2°; $[\alpha]_{316}$ = 1234·2°; M^+ 328 (Calcd for $C_{19}H_{20}O_5$. C, 69·50; H, 6·14; O, 24·36. Found: C, 69·08; H, 6·21; O, 24·07%). ν_{max} 3450, 3060, 2950, 1755 (γ-lactone) 1733 (sh), 1680 (C'C), 1440, 1370, 1253, 1190, 1030, 975, 955, 933, 890 (furan) cm^{-1} UV. λ_{max}^{EtOH} 221 nm (ε 10 332) (–C=C–CO–) NMR: (δ, ppm): 1·05 (*d*, 3H, *J* 6 *Hz*), 1·45–1·85 (*m*, 3H); 1·92 2·4 (*m*, 7*H*); 2·55 (*d*, 2H, *J* 8·5 Hz) –CH–CH_2; 4·8 *t*, IH) assigned to saturated γ-lactone terminal proton; 5·5 (*t*, IH) assigned to the α,β-unsaturated γ-lactone terminal proton; 6·45 (1H); 7·5 (2H). MS: *m/e* (abundance %), 328 (34·5), 310 (37), 300 (7·0), 2·89 (28), 283 (13), 282 (9·5), 265 (9), 234 (15·5), 229 (18), 206 (4·2), 201 (8), 190 (8·2), 179 (38·5), 150 (28), 136 (23), 105 (41), 96 (63), 95 (97), 94 (43).

* Part XXIV in the series of Medicinal plants of México. Part of this work was presented in the XII Congreso Latino americano de Química. Enero 6–8 de 1971. Chile.

[1] MIRANDA, C. and SUÑE, J. M. (1968) *Ars. Pharm.* **9**, 381.
[2] POPA, D. P. and REINBOLD, A. M. (1973) *Khim. Prir. Soedin.* **9**, 31; (1973) *Chem. Abst.* **78**, 148084.
[3] VARGAS, J. M. Personal communication.

The unsaponifable (4·1 g) was extracted with isopropylether, and chromatographed on silica gel. On elution with C_6H_6, 282 mg of triacontane were separated, m.m.p., IR, NMR. $CHCl_3$ eluted 235 mg of colorless plates, recrystallized from hexane–MeOH, and shown to be clerosterol m.p. 146–147°. $C_{29}H_{48}O$, M^+ 412, $[\alpha]_{589}$ − 40·0°; $[\alpha]_{578}$ − 40·7°; $[\alpha]_{546}$ − 48·4°; $[\alpha]_{436}$ − 86·7°; $[\alpha]_{365}$ − 152·3°. ν, 3400 (OH), 3010, 2900, 1620, 1459, 1360, 1040, 960, 885, (CH_2), 790 (C–CH_2/cm^{-1}. The most important signals in NMR, δ 5·30 (*m*, 1H), 4·75 (*m*, 2H), 1·75 (*s*, 3H). *Clerosterilacetate*, m.p. 142–143°, $C_{31}H_{50}O_2$, M^+ 454, soln chl. $[\alpha]_{589}$ − 41·4°; $[\alpha]_{578}$ − 42·7°; $[\alpha]_{546}$ − 48·9°; $[\alpha]_{436}$ − 83·4°; $[\alpha]_{365}$ − 134·4°. ν, 3010, 2900, 1720, 1620, 1450, 1360, 1250, 1040, 960, 885 cm^{-1}. The fragmentation of both mass spectra was as expected for clerosterol ($\Delta^{5,25}$-stigmastadien-3β-ol).[4–6]

Acknowledgements—To Prof. Ing. Sergio Aburto for collecting the plant material, to Dr. Paulino Rojas M. for botanical classification and to Dr. G. Teller Institut Chemie Strasbourg, for the MS. To OAS for a summer fellowship to one of us (A.M.) and to Syntex de Mexico for a research grant.

[4] MONZOOR-I-KHUDA, M. and SARELA, S. (1965) *Tetrahedron* **21**, 797.
[5] MONZOOR-I-KHUDA, *M.* (1966) *Tetrahedron* **22**, 2377.
[6] LENFANT, M., LECOMPTE, M. F. and FARRUGIA, G. (1970) *Phytochemistry* **9**, 2529.

Phytochemistry, 1974, Vol. 13, pp. 755 756. Pergamon Press. Printed in England.

LIPID CLASSES AND TOTAL FATTY ACIDS PATTERN OF *CICER ARIETINUM*

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(*Received* 6 *August* 1973. *Accepted* 18 *October* 1973)

Key Word Index—*Cicer arietinum*; Leguminosae; linoleic acid; essential fatty acids.

Plant. Cicer arietinum L. *Uses.* Food. *Source of tested seeds.* (a) North of India. Trivial name: Bengal Gram, Chana, Chola. (b) South of Italy. Trivial name: Cece.

Total lipids were extracted and purified from 2 g of powdered dry seeds: the amounts of phospholipids, triglycerides, cholesterol, free fatty acids and total fatty acids (by GLC) were determined (Table 1).[1–4]

Although Bengal Gram and Cece have different weights and sizes, their lipid contents were nearly similar (Table 1). The total fatty acids showed different contents of linoleic acid (18:2) (higher in Bengal Gram) and of myristic acid (14:0) (lower in Bengal Gram),

[1] FOLCH, J., LEES, M., SLOANE, G. H. (1957) *J. Biol. Chem.* **226**, 497.
[2] ALLEN, R. J. L. (1940) *Biochem. J.* **34**, 858.
[3] MARZO, A., GHIRARDI, P., SARDINI, D. and MERONI, G. (1971) *Clin. Chem.* **17**, 145.
[4] BÖTTCHER, C. J. F., WOODFORD, F. P., BOELSMA-VON HOUTE E. and VAN GENT, C. M. (1959) *Recueil des Travaux Chimiques du Pays Bas et de la Belgique* **78**, 794.