

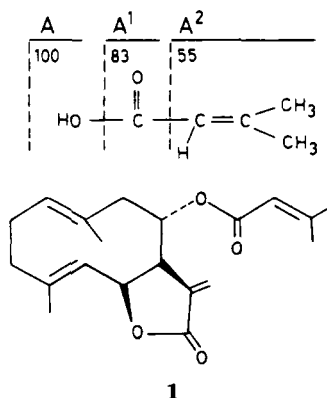
NEW GERMACRANOLIDE FROM *GOCHNATIA FOLIOLOSA* VAR. *FOLIOLOSA*MARITZA HOENEISEN,¹ and HANS BECKER*Institut für Pharmazeutische Biologie, Universität Heidelberg, West Germany*

Only seven representatives of the genus *Gochnatia* (tribe Mutisieae, subtribe Gochnatinae, Compositae) have thus far been studied chemically (1-6). Some of them contain sesquiterpene lactones (1-4,6).

We wish to report the isolation of a new *trans-trans* germacra-1(10),4-dien-*cis*-6,12-olide (**1**), from *Gochnatia foliolosa* (D. Don) D. Don ex H. et A. var. *foliolosa*; a similar compound was previously isolated from this plant (7). This is the first genus of the tribe Mutisieae in which these germacranolides have been found, although a few related compounds have been isolated elsewhere (7-12).

Compound **1** has a molecular formula $C_{20}H_{26}O_4$ as determined by hrms. Of the four oxygens, two form part of a lactone ring as indicated by the ir absorption of 1760 cm^{-1} , and two oxygens correspond to a conjugated ester (1715 cm^{-1}). The diagnostically important ions of m/z 230 (M-A)⁺, 83 (A¹), and 55 (A²) were present in the mass spectrum. Further identification resulted from comparison of the ¹H-nmr spectrum with that of 8 α -acetoxygermacra-1(10)-4-dien-*cis*-6-12-olide, previously isolated from *G. foliolosa* (7), whose structure has been verified by X-ray analysis (13). The spectra were essentially identical except for the resonances of the C-8 ester side-chain.

The following argument supports the absolute configuration specified in structure **1**. In costunolide and other *trans, trans*-germacra-1(10),4-dien-*trans*-6,12-olides of established absolute configuration where H-7 is α , interaction between the double bonds in the ten-membered ring gives rise to a strongly positive Cotton effect below 215 nm, while *cis* compounds exhibit a strongly negative Cotton effect below 215 nm (8). Since a qualitative determination showed that the lactone possessed a strongly negative Cotton effect below 215 nm, it must have the absolute configuration shown in **1**.



EXPERIMENTAL

PLANT MATERIAL.—*G. foliolosa* was collected near Florida Concepcion, Chile, in April 1983; a plant voucher specimen has been deposited at the herbarium of the Departamento de Botanica, Universidad de Concepcion, Chile (CONC).

The dried and ground aerial parts of *G. foliolosa* were extracted with EtOH and the lactone **1** purified by chromatography on silica gel, (Petroleum ether, EtOAc) reverse phase column chromatography (RP18; MeOH/H₂O, 85:15) and hplc (RP18; MeOH-H₂O, 85:15) to afford a colorless oil; uv λ max (MeOH) 216 nm ($\epsilon = 1.97 \times 10^4$); ir ν max (Nujol) 1760 (γ lactone), 1715 (Conj ester), 1650 (double bond) cm^{-1} ; ms (100 eV) m/z (rel. int; %) 330.186 (M⁺, 2), calcd for $C_{20}H_{26}O_4$ 330.182, 230 ([M-A]⁺, 58), 215 ([M-A-Me]⁺, 14), 202 ([M-A-CO]⁺, 6), 201 ([M-A-CHO]⁺, 7), 187 ([M-A-CO-Me]⁺, 11), 83 ([A¹]⁺, 100), 55 (A², 89); ¹H-nmr (250 MHz, CDCl₃, ζ) 6.35 (1H, d, $J = 1$ Hz, H-13b), 5.66 (1H, d, $J = 1$ Hz, H-13a), 5.27 (4H, m, H-1, H-5, H-6, H-8), 3.04 (1H, m, H-7), 1.72 (3H, s, H-15), 1.5 (3H, d, H-14), OCOCH=C(CH₃)₂ 5.9 (1H), 2.16 (3H, d, $J = 1$ Hz), 1.92 (3H, d, $J = 1$ Hz).

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ESSENTIAL OILS FROM BRAZILIAN COMPOSITAE

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Chemical and pharmacological screening of odoriferous and medicinal plants of the northeastern region of Brazil has been underway in our laboratories since 1975. In previous papers, we have reported the chemical composition of oils of regional species belonging to the Rutaceae, Verbenaceae, and Euphorbiaceae families (1-3).

In this paper, we describe the chemical composition of the essential oils from four species of the Asteraceae family (Compositae) (Table 1). Among the species studied, only *Bidens bipinnata* L. and *Pectis apodocephala* Baker have popular uses, the former being used as a diuretic and the latter as a sedative (4). In addition, *B. bipinnata* is used in the People's Republic of China against rheumatism, weakness, and furunculosis, showing also anticancer and anti-inflammatory activities (5).

TABLE 1. Essential Oils from Compositae Species from Northeastern Brazil, General Data

File ^a	Species	Voucher ^b	Common name	Part studied	Yield (%)
403	<i>Bidens bipinnata</i> L.	5843	Carrapicho de cavalo	Aerial	0.15
421	<i>Pectis apodocephala</i> Baker	5045	Cha de moca	Leaves	0.07
272	<i>Verbesina diversifolia</i> D.C.	8673	Camara branco	Leaves	0.10
220	<i>Wedelia scaberrima</i> Benth	7168	Camara de flexa	Leaves	0.10

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