Phytochemistry, Vol. 23, No. 3, pp. 581–582, 1984.
Printed in Great Britain.

0031–9422/84 $3.00 + 0.00

ESSENTIAL OIL ANALYSIS OF *THYMUS VILLOSUS* SUBSP. *LUSITANICUS*

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(*Revised received* 25 *August* 1983)

Key Word Index—*Thymus villosus* subsp. *lusitanicus*; Lamiaceae; chemical races; essential oils; terpenes.

Abstract—Vapor-phase chromatographic patterns obtained from the essential oils from three populations of *Thymus villosus* subsp. *lusitanicus* are discussed. Two infraspecific chemovars and two chemoforms can be distinguished.

INTRODUCTION

Thymus villosus L. subsp. *lusitanicus* (Boiss.) Coutinho, an endemic to Spain and Portugal, presents some taxonomic problems. Populations from the areas west of Toledo Mountains (Spain) are slightly different from those of the eastern parts near La Mancha (Spain). However, its essential oil has not yet been investigated.

We have examined the essential oils of three populations from these two regions. Volatile oils were selected for study since adequate knowledge of the main pathways responsible for their formation is already available both in genetic and biochemical terms [1].

RESULTS AND DISCUSSION

All samples of *Thymus villosus* subsp. *lusitanicus* were collected at flowering. The area of collection included the western, central and eastern regions of Toledo Mountains (Spain). From the results obtained (Table 1), we may note two chemovars and two chemoforms as follows: (1) chemovar camphor–borneol from Toledo (Spain); (2) chemovar linalol–camphor, chemoform (12.83–25.65%) from Cáceres and (3) chemovar linalol–camphor, chemoform (18.24–14.18%) from Ciudad Real (Spain).

Environmental factors seem to be an important factor in the chemical composition of the oils. The camphor–borneol chemovar, occurs in basic outcrops under severe xeric conditions [2]; this might account for the decrease in its linalol content (1.41%); the increase in ketones, 50% of total monoterpenes and the higher percentage of aromatic, bicyclics and sesquiterpenes (Table 1). The linalol–camphor chemovar occurs on silicic soils in more mesic situations, the level of its linalol content may attain 12.83% (chemoform from Cáceres) and 18.24% (chemoform from Ciudad Real).

EXPERIMENTAL

Voucher specimens are deposited in the Herbarium of the Real Jardín Botánico de Madrid (Spain) as follows: (1) Toledo: Los Yébenes, Sierra del Rebollarejo, 30S VJ 26, 11/6/1982, A. Velasco Negueruela. (2) Cáceres: Hospital del Obispo, Sierra de Guadalupe, 30S TJ 98, 11/6/1978, A. Velasco Negueruela. (3) Ciudad Real: Piedrabuena, Sierra del Rio Frio, 30S UJ 72, 26/6/1982, A. Velasco Negueruela.

Most of the individual compounds were tentatively identified

Table 1. Components of the essential oil of *Thymus villosus* subsp. *lusitanicus*

	Toledo (1) (%)	Cáceres (2) (%)	Ciudad Real (3) (%)
Acyclic			
β-Myrcene	0.18	0.41	2.57
Linalol	1.41	12.83	18.24
Citronellal	1.66	0.74	0.32
Linalyl acetate	—	7.81	0.48
Monocyclic			
α-Phellandrene	0.34	0.03	0.26
α-Terpinene	t	t	t
α-Limonene	t	t	t
1,8-Cineole	1.86	14.74	13.81
γ-Terpinene	0.08	0.12	1.14
β-Terpineol	—	—	0.54
1-Terpinen-4-ol	2.24	2.25	1.84
α-Terpineol	0.36	2.66	7.11
Bicyclic			
α-Thujene	0.21	0.19	0.24
α-Pinene	1.36	3.48	5.52
Camphene	7.64	4.41	5.75
β-Pinene	0.46	1.03	2.32
Sabinene	t	t	t
Camphor	36.97	25.65	14.18
Borneol	15.59	8.78	4.37
Bornyl acetate	t	t	0.44
Aromatic			
p-Cymene	1.76	1.41	0.44
Thymol	3.23	0.80	1.94
Unidentified	2.71	1.78	1.71
Sesquiterpenes			
β-Caryophyllene	0.43	t	0.93
Humulene	0.62	t	0.11
Cadinol?	—	4.36	7.96
Nerolidol	2.95	—	—
Unidentified	17.94	6.52	7.78
Total % of monoterpenes	78.06	89.12	83.22
Total % of sesquiterpenes	21.94	10.88	16.78

t, Trace.

by comparing their retention times with those of pure standards established under the same conditions in the author's laboratory [3]. We have also used IR analysis for further identification [4]. Oil concns were calculated from GC peak areas without correction factors. Leaves were steam distilled in a Clevenger apparatus. IR spectra were run as liquid films. Analytical GC was carried out with two columns: (1) Stainless steel column, 2 m × 1/8 in, packed with 5% silicon OV 1 and (2) Stainless steel column, 2 m × 1/8 in, packed with 10% Carbowas 20 M. Detector used dual FID. Carrier gas He. Flow rate 30 ml/min. Temp. programmed 70° to 225° at 2°/min. Injector temp, 250°. Detector temp, 275°. Injection vol. for all samples 0.04 μl.

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