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THE FATTY ACIDS FROM SOME PLANTS OF *MICROMERIA* GENUS

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Abstract. *The fatty acids of chloroform extracts of* Micromeria thymifolia *(Scop.) Fritsch and* Micromeria albanica *(Griseb. ex K. Malý) Šilić were investigated. By GLC were identified 9 fatty acids and it was found that unsaturated acids were prevailing compounds. It was also observed that the major components are: palmitic, linoleic and linolenic acids.*

Key words: *Micromeria thymifolia, Micromeria albanica, fatty acids*

1. INTRODUCTION

Micromeria thymifolia and *Micromeria albanica* are endemic species of the Balkan peninsula [1,2].

M. thymifolia (Scop.) Fritsch is also known as *Satureja thymifolia* (Scop.), *Melisas alba* Waldst. and Kit., *Calamintha thymifolia* (Scop.) Reichenb. and so on. It usually grows in clefts of fissured rocks and inside deep crevires mainly on karst, but also on serpentine, ranging from 30 m to 2000 m above sea level [1]. *M. albanica* is also known as *Satureja albanica* (Griseb. ex K. Malý). It is a plant of calcareous rocks, perpendicular quarry and undergrowth [1,2].

Chemical studies of these species concerned essential oils [3-6], flavonoides and triterpene acids [7]. These studies resulted in a better understanding of accumulation and composition of natural products, as well as chemotaxonomic distinctions between species.

The aim of this study was to enrich the chemotaxonomic data of the above mentioned species with those of acids composition of chloroform extracts, because of their insufficiency in literature.

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2. EXPERIMENTAL

General. The temperature of water bath of rotary evaporator during evaporation of solvent was below 50^0C. Petroleum used for extraction had b.p. 40-70^0C.

Plant material. Plant material was collected in the blooming phase of vegetation. *M. thymifolia* specimens were collected near Peć (location Rugovska klisura) and *M. albanica* near Prizren (location Duvska klisura) both in Serbia. Leaves, flowers and the green parts of stems were air-dried for ten days at room temperature.

Extraction. The plant material (100 g) was extracted by chloroform (500 mL) for 24 hours at room temperature. After separation of chloroform extract, the residue was extracted four times more in the same way. Collected chloroform extracts were evaporated on a vacuum till a constant weight was achieved. The extraction of *M. thymifolia* gave 4.44% and *M. albanica* 6.33% of residue.

Saponification and isolation. Chloroform extract (4.4 g) and 12% ethanolic solution of NaOH (45 mL) were refluxed for 2 hours on the steam bath. Water (50 mL) was added to the reaction mixture and cooled to room temperature. The part of the extract which failed to react was separated by extraction with petroleum. The water-ethanolic solution of soaps was acidifed with HCl (1:1) to pH 5-6 and extracted four times (50 mL) with petroleum. The combined organic phases were washed with a 10% sodium chloride solution till pH 7 was achieved. The evaporation of the solvent under reduced pressure afforded 0.18 g of fatty acids which are dried in vacuum desiccator over anhydrous $CaCl_2$.

Esterification. The fatty acids (0.18 g) and 1% methanolic solution of H_2SO_4 were refluxed for 1.5 hours on the steam bath. The reaction mixture was evaporated under reduced pressure. Water (50 mL) was added to the residue and reaction mixture was extracted three times with (30 mL) petroleum. The combined petroleum extracts were washed two times with 2% $NaHCO_3$ solution, than with water till pH 7 was achieved. The organic phase was dried over anhydrous sodium sulphate and concentrated to 5 mL under reduced pressure.

GLC. The methyl esters of fatty acids of *M. thymifolia* and *M. albanica* were analyzed on a "Hewlett Pacard 5890" series 2 instrument, FID, on a HP-FFAP column 25 m x 0.32 mm, carrier gas nitrogen (pressure 34 kPa). Temp. programmed 100-210°C at 6°/min., temps of injector 200^0C and detector 310°C. The identification of compounds was carried out by coinjection of authentic compounds. The obtained results are shown in Table I.

3. RESULTS AND DISCUSSION

The extraction of ground dry plant material gave 4.44% chloroform extract of *M. thymifolia* and 6.33% of *M. albanica.*

The saponification of chloroform extracts by 12% NaOH ethanolic solution afforded free fatty acids which were esterifed by methanol and obtained methyl esters GLC analysed.

The identification by GLC of fatty acids gave the results shown in Table 1. It is obvious that unsaturated fatty acids were prevaling compounds in both examined species.

The relation between unsaturated and saturated acids of *M. thymifolia* was 58:20 (ϒ3:1) and for *M. albanica* 56:29 (ϒ2:1). The main components were palmitic, linolic and linolenic acids.

Table 1. Esters of fatty acids in the chloroform extracts of *M. thymifolia* and *M. albanica*

Components	*M. thymofolia* Yield %	*M. albanica* Yield %
methyl laurate	1.46	0.38
methyl myristate	0.91	1.27
methyl palmitate	15.64	22.96
methyl stearate	2.37	3.95
methyl oleate	6.05	7.75
methyl linolate	12.45	12.64
methyl linolenate	37.42	32.86
methyl arachidate	1.21	1.75
methyl behenate	1.06	0.94

From our results it may be concluded that palmitic, linolic and linolenic acids are the chemotaxonomic characteristic of the whole *Micromeria* genus.

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MASNE KISELINE IZ NEKIH BILJAKA RODA *MICROMERIA*

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Ispitivane su masne kiseline hloroformskih ekstrakata Micromeria thymifolia *(Scop.) Fritisch i* Micromeria albanica *(Griseb. ex K. Malý) Šilić. Metodom GLC identifikovano je 9 masnih kiselina i utvrđeno da kod obe vrste preovlađuju nezasićene kiseline. Najzastupljenije masne kiseline su: palmitinska, linolna i linolenska.*

Ključne reči: *Micromeria thymifolia, Micromeria albanica, masne kiseline*