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COMPOSITION OF THE FRUIT OILS OF *CAPPARIS* SPECIES

CAPPARİS MEYVA YAĞLARININ BİLEŞİMİ

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This is the first report on the fruit oil composition of two Capparis species from Turkey. The fruits of C.spinosa and C.ovata contained 17.7 and 15.9% oil respectively. Myristic, palmitic, palmitoleic, stearic, oleic, elaidic, linoleic, linolenic acids were determined mainly by GC and GC/MS. β-sitosterol was determined in the unsaponifiable matter of the oils.

Bu çalışmada Türkiye'de yetişen iki Capparis türünün meyva yağları yağ asitleri bakımından araştırılmıştır. C.spinosa ve C.ovata'nın meyvaları sırasıyla %17.7 ve %15.9 yağ içermektedir. Gaz kromotografisi ve Gaz kromotografisi/Mass spektrofotometresi yöntemlerinde yağlarda başlıca miristik, palmitik, palmitoleik, stearik, oleik, elaidik, linoleik ve linolenik asitler tayin edilmiştir. Ayrıca yağların sabunlaşmayan kısmında β-sitosterolun bulunduğu tespit edilmiştir.

Keywords : *Capparis ovata; Capparis spinosa; Capparaceae; Caper; Fatty acids of Capparis L. sp.*

Anahtar kelimeler : *Capparis ovata; Capparis spinosa; Capparaceae; Caper; Capparis L. sp. yağ asitleri*

Introduction

Capparis L. sp. (Capparaceae) are straggling shrubs with showy flowers. *Capparis ovata* Desf. and *Capparis spinosa* L. are widespread in Turkey (1,2). Buds and fruits of these plants are used as folk medicine (3). The plants were reported to have diuretic, tonic, expectorant, antitumour, antiinflammatory, hypotensive and spasmolytic effects and are used for rheumatism, gout, paralysis, tuberculosis complaints (4-6). The decoction of *C.spinosa* fruits is used in the treatment of cough and diabetes and the ground fruits are used against rheumatism externally in Israel (7). *C.avicennifolia* and *C.oleoides* are known as Fructus Simulo and used as antiepileptic and antihysteric agents in Peru and South Africa (8-9). Stachydrine derivative alkaloids, glucosinolates, oils, resins and ascorbic acid have been found in the fruits (10,13). Oleic and linoleic acid have also been determined in *C.rothi, C.aphylla, C.tomentosa* and palmitoleic acid in *C.divaricata* seed oil (14,15). This study deals with the oils isolated from the fruits of *C.spinosa* and *C.ovata.*

Materials and Methods

Plant material : Fruits of *C.ovata* were collected from Muğla to Marmaris, in August, 1994, *C.spinosa* from Antalya to Side in August, 1994 (SW and S Turkey). Voucher speciments are kept in the Herbarium of Department of Pharmacognosy in Faculty of Pharmacy, Gazi University.

Reagents: All solvents and chemicals used were either analytical or HPLC grade. Fatty acid standards were purchased from Sigma.

Extraction of the oils : Dried fruits were powdered in presence of dry Na_2SO_4. The oils were extracted with petroleum benzin (50-70°C) in a Soxhlet apparatus. Extracts were evaporated in *vacuo* and weighted. After saponification of oil with 20% alcoholic KOH, the free fatty acids were converted to their methyl esters with 10% BF_3 in MeOH (16). 1% solution of methyl esters in dichloromethane were used for GC and GS/MS.

GC : The GC analysis was carried out using Hewlett Packard 5890 Series II with HP 3398-II integrator. Ultra I: Corros-linked methyl silicone gum phase column (50 m x 0.2 mm x 0.3 m) was used. Carrier gas was helium, flow rate 0.9 ml/min. Temparature program 190°C-250°C at 2°C min detector (FID) and injector temp. 250°C, split 1:50, injection vol. 0.2 µl.
GC/MS : The GC/MS analysis was carried out using Hewlett-Packard GCD system. Innowax FSC column (60 m x 0.25 mm) was used with helium as carrier

gas. GC oven temperature was kept at 60°C for 10 min and programmed to 220°C at a rate of 4°C/min and kept constant at 220°C for 10 min programmed to 240°C at a rate of 1°C/min. Split flow was adjusted at 50 ml/min. The injector and detector temperatures were at 250°C. MSS were taken at 70 eV. Mass range was from m/z 10 to 425. Library search was carried out using Wiley GC/MS Library.

The unsaponifiable matter : The oils were saponified by refluxing with 20% alcoholic KOH for two hr, added H_2O and extracted with diethylether three times. The combined extracts were washed with H_2O dried over anhydrous Na_2SO_4 and the solvent was removed under reduce pressure. Unsaponifiable material was performed on TLC with a solvent system of benzene : acetone (85:15) on silica gel precoated plates. β-sitosterol was used as standard. Spots were visualised with 30% aqueous solution of H_2SO_4.

Results and Discussion

In this study, the fruits of *Capparis* species growing in Turkey were investigated with respect to their oil contents and compositions. The amounts of the oils were found to be 17.7 and 15.9% in *C.spinosa* and *C.ovata* fruits, respectively. Chemical properties of the oils are shown in Table 1.

Table 1. Chemical properties of the oils of *Capparis* species

Specifications	Species	
	C.ovata	*C.spinosa*
Acid value	39.79	35.43
Iodine value	80.00	68.00
Saponification value	215.00	195.00

The fatty acids in saponifiable parts of the oils were determined by gas chromatography and gas chromatography/mass spectrometry. The identifications of the components were carried out by comparison of their Rt and MS with those of the authentic samples, literature data and computerized MS data banks. The fatty acid percentages and retention times are shown in Table 2.

Table 2. Retention times and percentages of the fatty acids

Fatty acids	Rt*	% *C.ovata*	% *C.spinosa*
Caprylic	25.2	0.03	-
Nonanoic	28.9	0.02	0.80
Capric	32.3	0.07	0.03
Lauric	38.4	0.14	0.27
Tridecanoic	41.1	0.04	0.03
Myristic	43.8	0.66	1.36
Pentadecanoic	46.2	0.04	0.03
Palmitic	48.7	11.28	18.33
Palmitoleic	49.3	2.04	4.47
9,12 Hexadecadienoic	50.7	0.12	0.37
Heptadecanoic	51.0	0.14	0.13
Stearic	53.7	4.38	4.94
Oleic	54.4	25.04	23.32
Elaidic	54.6	14.95	16.22
Linoleic	56.0	34.16	22.44
Linolenic	58.1	1.04	2.46
Arachidic	60.7	1.00	0.85
Heneicosanoic	65.3	0.05	-
Behenic	70.3	1.13	-
Lignoceric	81.3	0.12	-

* on the polar column

After application of the unsaponifiable materials to TLC, β-sitosterol (Rf 0.15) was determined and it was isolated by using PTLC. Its melting point and IR spectrum were compared with an authenthic sample.

In conclusion, the amounts of oils in fruits were almost the same. The major components of the oils were linoleic and oleic acids. Linoleic and oleic acid contents in the oil of content *C.ovata* were higher than that of *C.spinosa*, while palmitic acid was higher in *C.spinosa*. Elaidic acid was another major component of the oils.

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