FATTY ACIDS OF THE SOFT CORAL *Gersemia rubiformis*

N. A. Latyshev, A. N. Malyutin, L. S. Kogtev, and V. V. bezuglov

UDC 577.115.593.62

The tropical coral anthozoan polyps are well known as producers of various prostanoids [1]. Recently a second pathway of the oxidative metabolism of polyenic fatty acids (FAs) has been found in these organisms — a lipoxygenase pathway [2, 3]. We have determined the FA composition and have identified the hydroxy acids of the lipids of the soft coral *Gersemia rubiformis*, gathered on the shores of the Kamchatka peninsula in December—April. The lipids were isolated by the Bligh—Dyer method [4]. The preparation, analysis, and identification of the FA methyl esters were carried out as described in [5]:

FA	December	April	FA	December	April
14 : 0	0,4	0,7	20 : 3ω6	—	1,8
15 : 0	0,3	0,4	20 : 4ω6	22,0	9,0
16 : 0	12,2	5,2	20 : 3ω3	—	2,8
16 : 1	1,4	2,3	20 : 4ω3	7,7	6,9
16 : 2	0,5	0,7	20 : 5ω3	12,6	13,5
16 : 3	—	0,3	22 : 2	1,6	0,8
18 : 0	0,8	0,6	22 : 4	0,7	0,7
18 : 1	3,7	10,5	22 : 5ω3	1,7	2,3
18 : 2ω6	4,3	10,6	22 : 6ω3	2,5	1,2
18 : 3ω3	1,6	9,7	22 : 1	0,9	1,4
18 : 4ω3	2,2	7,5	X(ECL24,25)*	1,2	—
20 : 1	6,6	3,5	24 : 4	5,8	3,0
20 : 2	3,2	2,2	24 : 6ω3	6,3	2,4

The fatty acid composition is characterized by a high content of polyenic FAs. A season-dependent redistribution of the acids of the ω3 and ω6 series is observed, particularly in relation to arachidonic acid (AA). The UV spectrum of the April extract had a maximum at 235 nm that is characteristic for polyhydroxy FA [2, 3]. Neither lipid extract contained prostaglandins in UV-detectable amounts.

The successive chromatography of 280 mg of the lipid extract on silica gel in chloroform—methanol and benzene—ethyl acetate gradient systems yielded 14 mg of a compound with λ_{max} 235 nm in methanol. The compound had a chromatographic mobility in TLC corresponding to a hydroxypolyenic acid [3]. GLC-MS of the methylated and silylated compound showed complete similarity to the mass spectra of the TMS derivative of the methyl ester of 8-hydroxyeicosatetraenoic acid (8-HETE): m/z 406 (M)+0.3%; 391, (M–CH_3)+1.8%; 375, (M–OCh_3)+1.1%; 295, (M–111)+2.4%; 265, (M–141)+100%; 199, (M–207)+4.2%/

It has been shown previously that the ion with m/z 265 is formed by the cleavage of the C-7—C-8 bond in the molecule of the TMS derivative of the methyl ester of 8-HETE and, consequently, is a diagnostic characteristic for a structure of this type [3]. The mass spectrum also showed the presence of an ion with m/z 263. Its appearance can be explained by the presence of 8-hydroxyeicosapentaenoic acid (8-HEPE) in the sample. Since, together with AA, eicosapentaenoic acid is the predominating polyenic FA, the formation of 8-HEPE is normal.

Thus, the 8-HETE and 8-HEPE detected in a lipid extract of *G. rubiformis* show the presence of a specific 8-lipoxygenase.

*FA not identified (ECL = equivalent chain length).

Institute of Marine Biology, Far Eastern Branch, USSR Academy of Sciences, Vladivostok.
Translated from Khimiya Prirodnykh Soedinenii, No. 3, pp. 447-448, May-June, 1988. Original article submitted December 4, 1987.

0009-3130/88/2403-0383 $12.50

LITERATURE CITED

1. G. L. Bundy, Adv. Prost. Thromb. Leuk. Res., 14, 229 (1985).
2. D. R. Doerge and M. D. Corbett, Experientia, 38, 901 (1982).
3. G. L. Bundy, E. C. Nidy, D. E. Epps, S. A. Mizsak, and R. J. Wnuk, J. Biol. Chem., 261, No. 2, 747 (1986)..
4. E. G. Biligh and W. J. Dyer, Can. J. Biochem. Physiol., 37, 911 (1959).
5. N. A. Latyshev, V. V. Bezuglov, L. S. Kogtev, Nguen Kim Khung, V. L. Sadovskaya, B. V. Rozynov, and L. D. Bergelson, Biol. Morya, No. 3, 69 (1986).

ESSENTIAL AND FATTY OILS OF Agastache rugosa

A. M. Zakharov, V. S. Dolya, O. I. Zakharova, A. S. Bespalova, and N. V. Litvinova

UDC 547.913 + 547.915

Wrinkled giant hyssop Agastache rugosa (Fisch, et Mey) Kuntze, family Lamiaceae growing in the Far East, is the sole representative of the genus Agastache Clayt ex Gronow on the territory of the Soviet Union [1]. It is a perennial herbaceous plant with a height of up to 1.7 m possessing a high crude weight that is being successfully cultivated in the collection of the Northern Caucasus zonal experimental station of VILR as a promising medicinal plant. In experiments, galenical preparations of it have shown a tranquilizing and anticonvulsive action [2]. In addition, the essential oil of wrinkled giant hyssop is used in the perfumery, soapboiling, confectionery, fishery, and preserving industries [3].

The isolation from this plant of the flavonoid compounds tilianin, acacetin, linarin, and agastachosid [4] and the quantitative and qualitative compositions of the essential oil [3, 5] have been reported previously.

We have continued an investigation of wrinkled giant hyssop and have studied the physicochemical properties of the essential and fatty oils and also the acid composition of the fatty oil. The essential oil was distilled off from the leaves with steam. The fatty oil was extracted from the previously dried and ground seeds with petroleum ether (bp 40-70°C) in a Soxhlet apparatus. The physicochemical indices of the oils and of the fatty acid fractions were determined by known methods [6, 7]. The qualitative fatty acid composition and the amounts of individual fatty acids were established by gas-liquid chromatography on a Tsvet-4 chromatograph with a flame-ionization detector. The temperature of the thermostat was 193°C and that of the evaporator 300°C. The column had a diameter of 4 mm and a length of 2 m. The solid support was Celite 545 (40-60 mesh), the liquid phase was diethyleneglycol succinate (10%), tnd the carrier gas argon (rate of flow 60 ml per minute). The chart speed was 400 mm/h, the volume of sample injected 0.02-0.1 μl, and the rate of feed of hydrogen 2 liers/h.

The fatty acids were identified by the internal-standard method and by comparing the retention times of known samples on a chromatogram. The known samples used were the fatty acids of a number of a oils (sunflower seed, mustardseed, peanut, etc.), fatty acids produced by the domestic industry (mixtures of fatty acids of the C_5—C_{17} and C_8—C_{24} fractions), and also individual acids — lauric, palmitic, stearic, oleic, linolenic, linoleic, erucic, etc. We also used the results of preceding investigations [8] and literature information [9,10]. The quantitative determination of each acid was carried out by known methods [11].

The physicochemical properties of the essential oil are given in Table 1 and those of the fatty oil in Table 3, the fatty acid composition being shown in Table 2.

Attention is directed to the large amount of linolenic acid in the fatty oil and its high iodine number. From these characteristics, the oil may be assigned to the drying type.

Northern Caucasus Zonal Experimental Station of VILR [All-Union Scientific Research Institute of Medicinal and Aromatic Plants], Vasyurinskaya, Krasnodar Territory. Translated from Khimiya Prirodnykh Soedinenii. No. 3, pp. 449-450, May-June, 1988. Original article submitted July 15, 1987; revision submitted January 1, 1988.

 0009-3130/88/2403-0384 $12.50