PHENOLIC AND FLAVONOID COMPOUNDS OF Ziziphora clinopodioides

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We have previously reported the isolation from the epigeal part of Ziziphora clinopodioides Lam. (Lamiaceae) of oleanolic acid, chrysin 7-O-rutinoside, linarin, and diosmin [1]. Continuing our investigations, from the benzene-soluble and pigment-freed [2] part of a methanolic extract of the plant we have isolated three individual compounds (I-III) by column chromatography (CC) on silica gel with elution by chloroform. The substances isolated have been identified on the basis of qualitative reactions, IR, UV (with diagnostic additives), PMR, and mass spectra of compounds (I-III), and also the PMR and mass spectra of the acetates of (II) and (III).

Compound (I) – $C_{10}H_{12}O_5$, yellowish acicular crystals, mp 104-107°C (hexane–acetone (7:2)), R_f 0.51 (here and below, Silufol UV-254, hexane–acetone (5:4)); λ_{max}^{MeOH}, nm, 219, 278; M^+ 212 – was identified as methyl 4-hydroxy-3,5-dimethoxybenzoate [3].

Compound (II) – $C_{19}H_{18}O_8$, light yellow crystalline substance, mp 163-165°C ($CHCl_3$), R_f 0.45; λ_{max}^{MeOH}, nm: 255 sh., 279, 348; M^+ 374 – was characterized as 7-O-methylsudachitin (4',5-dihydroxy-3',6,7,8-tetramethoxyflavone). The diacetate of (II) had mp 152-153°C (hexane–acetone); M^+ 458 ($C_{23}H_{22}O_{10}$) [4].

Compound (III) – $C_{18}H_{16}O_8$, yellow crystalline substance, mp 228-230°C ($CHCl_3$), R_f 0.31; λ_{max}^{MeOH}, nm: 255 sh., 291, 345; M^+ 360 – was identical with thymonin (4',5,6-trihydroxy-3',7,8-trimethoxyflavone). The triacetate of (III) had mp 191-192°C (benzene–ether (6:1)), M^+ 486 ($C_{24}H_{22}O_{11}$) [5, 6].

From the ethyl acetate fraction of a methanolic extract of the plant, a compound (IV) was isolated by CC on silica gel in the $CHCl_3$–MeOH (5%) system which, on the basis of PMR and mass spectra and a comparison with an authentic sample (TLC, melting point) was identified as caffeic (3,4-dihhdroxycinnamic) acid [3]. Luteolin (3',4',5,7-tetrahydroxyflavone) (V) was detected as a minor component in the ethyl acetate fraction by TLC.

This is the first time that compounds (I-V) have been detected in plants of the genus Ziziphora.

By the method of [7], we have established that thymonin in a concentration of 62.5 μg/mm suppresses the growth of a number of test cultures of staphylococci (Staphylococcus aureus 209P, St. aureus Smith, and St. aureus 25923) and, in concentrations exceeding 2500 μg/ml the growth of the E. coli 0-55 and Shigella dysenteria Flexneri 121. The peroral administration of thymonin to mice in a dose of 2 g/kg did not cause visible toxic symptoms.

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