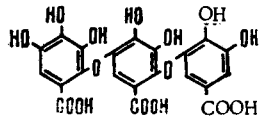
Methylation with diazomethane gave a decamethyl derivative with mp 117°C, $C_{31}H_{33}O_{15}$, mol. wt. 646 (mass spectrometrically). IR spectrum: 2930, 1730, 1600, 1100 cm^{-1}. NMR spectrum (ppm): signals of four aromatic protons in the form of a doublet with a singlet at δ 7.23, singlet at 6.80, doublet at 6.72 (J = 2 Hz), and the signals of the protons of ten methoxy groups at 4.00 (3H), 3.86 (12H), 3.70 (12H), and 3.52 (3H). On hydrolysis with 2 N NaCH, a heptamethyl ether was obtained with mp 277°C. Titration of the heptamethyl ether showed the presence of three carboxy groups.

On the basis of the results obtained, acid 2 is a dehydrotrigallic acid not previously described in the literature and has the structure



The NMR spectra were taken in IOKÉ of the Academy of Sciences of the Kazakh SSSR and the mass spectra in the Lenin Tashkent State University.

LITERATURE CITED

1. T. K. Chumbalov, T. N. Bikbulatova, and M. I. Il'yasova, Khim. Prirodn. Soedin., 421 (1974).
2. O. T. Shmidt, in: Biochemical Methods of Plant Analysis [in Russian], Moscow (1960), p. 539.
3. O. T. Schmidt and E. Komarek, Ann. Chem., 591, 153 (1954).
4. W. Mayer, Ann. Chem., 578, 34 (1952).

NEW ESTERS OF UGAMDIOL FROM THE ROOTS OF *Ferula involucrata*

Kh. M. Kamilov, V. M. Potapov, and G. K. Nikonov

UDC 547.913.5+547.587

By column chromatography on silica gel we have isolated from a methanolic extract of the roots of Ferula involucrata Eug. Kor. two new esters which we have called involucrin (I) and involucrinin (II).

Substance (I), $C_{27}H_{38}O_8$, mp 154-155°C, $[\alpha]_D^{24}$ −33.4° (c 0.89; chloroform), M^+ 490, dissolves readily in ether, chloroform, and ethanol and is insoluble in petroleum ether and water. Its UV spectrum has λ_{max} 270 nm (log ε 4.01), which shows the presence of a benzene nucleus in the molecule. In the IR spectrum there are absorption bands at 1750 and 1720 cm^{-1} (ester carbonyls) and at 1600 and 1510 cm^{-1} (aromatic nucleus). On saponification with caustic soda, involucrin is cleaved forming 3,4,5-trimethoxybenzoic acid and ugamdiol [1], which were identified by mixed melting points, IR spectroscopy, and chromatography in a thin layer of cellulose.

The facts given show that involucrin is a diester of ugamdiol. This is confirmed by the NMR spectrum of involucrin [signals at 5.50 and 4.90 ppm (2H) corresponding to two geminal protons], and also by a comparison of the positions of the signals of the geminal and hemihydroxyl protons in the NMR spectra of the diester, the monoester, and ugamdiol itself.

To establish the positions of the acid residues, we performed mild hydrolysis (5% Na_2CO_3 at room temperature). A substance was obtained with mp 124-125°C which was identified by a mixed melting point as ugaferin, i.e., a monoester of ugamdiol with 3,4,5-trimethoxybenzoic acid at the C_6 position, and acetic acid was detected chromatographically in the hydrolyzate.

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent.

Translated from Khimiya Prirodnykh Soedinenii, No. 1, p. 132, January-February, 1976. Original article submitted April 15, 1975.

It follows from these facts that in involucrin the 3,4,5-trimethoxybenzoic acid occupies the same position as in ugaferin, and the acetic acid is bound to the second hydroxyl of ugamdiol at C_8; consequently, (I) has the structure of 8-acetoxy-6-(3',4',5'-trimethoxybenzoyloxy)ugamdiol.

Substance (II), an oily product with the composition $C_{30}H_{42}O_8$, $[\alpha]_D^{24} -28.2°$ (c 0.55; chloroform), M^+ 530, is readily soluble in organic solvents and insoluble in water. On mild hydrolysis (3% $NaHCO_3$) it undergoes cleavage, forming ugaferin and angelic acid, and on severe hydrolysis (10% KOH) it gives ungamdiol, $C_{15}H_{26}O_3$, mp 82-83°C, $[\alpha]_D^{24}$ +45.5° (c 1.05; chloroform), 3,4,5-trimethoxybenzoic acid, $C_{10}H_{12}O_5$, mp 166-168°C, and angelic acid. The formation of ugaferin on mild hydrolysis shows that (II) has the structure of 8-angeloyloxy-6-(3',4',5'-trimethoxybenzoyloxy) ugamdiol.

In addition to the substances mentioned above, we also isolated two monoesters of ugamdiol, (III) and (IV). On saponification, (III) formed ugamdiol and 3,4,5-trimethoxybenzoic acid, and (IV) formed ugamdiol and 2-hydroxy-2-methylbut-3-enecarboxylic acid.

LITERATURE CITED

1. N. P. Kir'yalov, Abstracts of the Third Indo–Soviet Symposium on the Chemistry of Natural Compounds [in Russian], Tashkent (1973), p. 87.

MEDICOBIOLOGICAL ASPECTS OF THE PROBLEM OF FOOD PROTEIN (ALL-UNION SYMPOSIUM)

F. R. Kadyrova

The coordination of investigations in the field of the search for additional and new sources of protein which could eliminate the protein shortage in the feeding of the population was the aim of the First All-Union Symposium on the Chemistry, Biology, Isolation, and Technology of the production of Food Protein and Its Medicobiological Evaluation held in Tashkent in November, 1975. It was organized by the State Committee for Science and Technology at the Council of Ministers of the USSR, the Academy of Sciences of the Uzbek SSR, and the Academy of Medical Sciences of the USSR.

Doctors, chemists, biologists, and technologists from Moscow, Leningrad, Kiev, Kaunas, Vladivostok, Odessa, Murmansk, Krasnoyarsk, Minsk, Voronezh, Tbilisi, Tallin, Alma-Ata, and Samarkand took part in the symposium.

A greeting to the participants in the symposium was given by Academician A. S. Sadykov, who observed that the holding of the symposium in Tashkent was due to the fact that this is where there is a large scientific center – the Institute of the Chemistry of Plant Substances of the Academy of Sciences of the Uzbek SSR, where, under the direction of Corresponding Member of the Academy of Sciences of the USSR S. Yu. Yunusov, urgent problems of the chemistry and technology of producing natural compounds are being solved. At the symposium 50 lectures were delivered, six of them in plenary sessions.

Academician A. A. Pokrovskii gave a lecture devoted to the medicobiological aspects of the problem of food protein. He observed that the main role in covering the world shortage of protein must be played by the intensification of agricultural production in order to obtain traditional food products; the development of fisheries and fish farming; the fight against losses of protein during storage; the creation of products of increased biological value; the use of food protein from soybean, sunflower seed, and cottonseed meals; the stimulation of investigations in the field of protein by unicellular organisms; and investigations in the field of the possibility of producing synthetic protein.

In his lecture, the Deputy Head of the Division of the Light and Food Industries of the State Committee for

Translated from Khimiya Prirodnykh Soedinenii, No. 1, pp. 133-134, January-February, 1976.