PHENOLIC COMPOUNDS OF Euphorbia ferganensis AND Astragalus orbiculates

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Countinuing an investigation of the components of the roots of Euphorbia ferganensis B. Fedtsch. [1, 2], part of the ethyl acetate fraction of the ethanolic extract has been chromatographed on a column of the silica gel in the chloroform–acetone (8:2) system. By rechromatography of the fractions so obtained in the same system and by preparative thin-layer chromatography on silica gel in the acetone–hexane (1:1) system we have isolated two individual compounds of phenolic nature.

Compound (I) – $C_7H_6O_5$, M^+ 170, mp 220-222°C (from water), $\lambda_{max}^{ethanol}$ 208, 274 nm. On the basis of the results of a study of IR, UV, and mass spectra, and also of a direct comparison with an authentic sample, it was identified as gallic acid.

Compound (II) – $C_{14}H_8O_8$, M^+ 302, mp 357-359°C (with decomposition). The UV spectrum had maximum, $\lambda_{max}^{ethanol}$, at 254, 350 (inflection), and 363 nm. The methylation of (II) with an ethereal solution of diazomethane led to a substance with the composition $C_{18}H_{14}O_8$, M^+ 358, mp 342-343°C (with decomposition), identical with the tetramethyl derivative of ellagic acid [2, 3]. Consequently, compound (II) was ellagic acid, as was confirmed by a comparison of its physicochemical properties with those of synthetic ellagic acid obtained by oxidizing gallic acid with potassium persulfate in glacial acetic acid [4].

In order to study the phenolic compounds of the epigeal part of Astragalus orbiculatus (family Leguminosae), the comminuted raw material was extracted with methanol. The concentrated methanolic extract was filtered, and the filtrate was extracted with hexane. The extract was evaporated, and the residue was chromatographed on a column of silica gel with elution by the benzene–methanol (15:1) system. A substance was isolated with the composition $C_{17}H_{18}O_5$. M^+ 302, mp 149-150°C (from benzene), ν_{max}^{KBr} 3530, 3450-3415 (OH groups); 1623, 1594 (aromatic C=C bonds). The UV spectrum of the substance isolated (($\lambda_{max}^{ethanol}$ 280, 288 nm) confirmed the presence of hydroxybenzene rings in its molecule.

The PMR spectrum contained, together with the signals of two OCH_3 groups and of five aromatic protons, signals characteristic for the heterocyclic ring of an isoflavan.

The mass spectrum contained the peaks of ions with m/z 135 and 123, characteristic for isoflavans containing one free phenolic hydroxy group in ring A. Intense peaks of ions with m/z 180, 168, and 167 showed that there were two methoxy groups and one hydroxy group in ring B.

Methylation with an ethereal solution of diazomethane gave a dimethyl ether with mp 137-138°C.

The spectral and chemical characteristics reported above showed that the substance that we had isolated was identical with the isoflavan sphaerosin [5].

Thus, from É. ferganensis we have isolated gallic and ellagic acids, and from Astragalus orbiculatus the isoflavan sphaerosin.

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