COUMARINS AND FLAVONOIDS OF SOME SPECIES OF *Polygonum*

I. G. Levashova and V. P. Zhdanova

UDC 547.972

The genus *Polygonum* is one of the most widespread in the flora of the USSR. Some species have found wide use in scientific and folk medicine [1], and also as fodder and technical plants [2]. The present communication presents the results of a chemical study of the biologically active compounds of two *Polygonum* species: the roots and epigeal part of *P. weyrichi* F. Schmidt and the epigeal part of the transbaikalian knotweed *P. divaricatum* L.

The coumarins and flavonoids were isolated by the following scheme: The comminuted plant raw material was extracted with a tenfold amount of 80% ethanol. The resulting extract was evaporated to an aqueous residue, which was extracted successively with chloroform and butanol. As a result of the investigation of the chloroform fraction, in the roots of *P. weyrichi* were detected not less than three substances of coumarin nature, two of which were isolated by column chromatography on silica gel (with petroleum ether as eluent) and were identified as coumarin ($C_9H_6O_2$, mp 67°C) and herniarin ($C_{10}H_8O_3$, mp 117-118°C). In the butanolic fraction the presence of seven compounds of flavonoid nature was established by paper chromatography in the solvent systems: 5% acetic acid, and butan-1-ol–acetic acid–water (4:1:3) [3].

Five compounds were isolated from the epigeal parts of *P. weyrichi* and *P. divaricatum*: quercetin and its glycosides – avicularin [$C_{20}H_{18}O_{11}$, mp 209-211°C, $[\alpha]_D^{20}$ −159° (methanol)]; hyperoside [$C_{21}H_{20}O_{12}$, mp 244-246°C, $[\alpha]_D^{20}$ −59.0° (ethanol)], quercitrin [$C_{21}H_{20}O_{12}$, mp 184-186°C, $[\alpha]_D^{20}$ −183.4° (ethanol)], and rutin ($C_{27}H_{30}O_{16}$, mp 188-191°C, $[\alpha]_D^{20}$ −32.9° (DMFA).

Of catechins, (+)-catechin and (−)-epicatechin were detected by paper chromatography in various solvent systems.

The substances isolated were identified from their physicochemical properties, mixed melting points with authentic samples, and UV and IR spectroscopies.

This is the first time that coumarins have been isolated from *P. weyrichi*.

The substances isolated from the plants investigated explain their main pharmacological activity. Thus, the flavonoids rutin, hyperoside, and quercetin possess antiphlogistic and cholegogic activity [4], and also a vitamin P action [5]. It has also been established that the flavonoids isolated possess hypoazotemic activity, lowering the level of toxic and nitrogenous metabolites in the blood by between 25 and 35% [6].

LITERATURE CITED

1. N. P. Maksutina, N. F. Komissarenko, A. P. Prokopenko, et al., Plant Drugs [in Russian], Kiev (1985), p. 165.
2. V. S. Sokolov, Questions of the Study and Use of Tanning Substances in the USSR [in Russian], Moscow–Leningrad (1963), p. 17.
3. M. S. Dudkoin, M. A. Parfent'eva, N. G. Shkantova, and I. G. Bozhko, Rast. Res., 16, No. 2, 228 (1980).
4. N. F. Komissarenko and I. G. Levashova, Rast. Res., 16, No. 4, 406 (1980).
5. V. A. Baraboi, Plant Phenols and Human Health [in Russian], Moscow (1984), p. 10.
6. I. G. Levashova, L. N. Vasil'eva, and E. A. Vasil'chenko, Abstracts of Lectures at an All-Union Scientific and Technical Conference on the Creation and Running of Industrial Process for the Utilization of Secondary Raw Material [in Russian], Moscow (1988), p. 70.

All-Union Scientific-Research Institute of Drug Chemistry and Technology, Khar'kov.
Translated from Khimiya Prirodnykh Soedinenii, No. 4, pp. 551-552, July-August, 1990. Original article submitted November 28, 1989.

0009-3130/90/2604-0469$12.50 © 1991 Plenum Publishing Corporation