

PHENOLIC COMPOUNDS OF SORBARIA SORBIFOLIA

V. G. Zaitsev, G. V. Makarova, and N. F. Komissarenko

Khimiya Prirodnikh Soedineii, Vol. 5, No. 6, p. 598, 1969

UDC 581.192

From ethanolic extracts of the leaves and flowers of S. sorbifolia (L.) A. Br. (Ural falsespirea) we have isolated nine substances, some of which have been identified with known phenolic compounds by their physicochemical properties, UV and IR spectra, and conversion products.

- I. Kaempferol 3-arabofuranoside, $C_{20}H_{18}O_{10}$, with mp 227–229° C, $[\alpha]_D^{20} -162.4^\circ$.
- II. Astragalinal, $C_{21}H_{20}O_{11}$, with mp 173–175° C, $[\alpha]_D^{20} -56.0^\circ$.
- III. Quercetin 3-glucuronide, $C_{21}H_{18}O_{13}$, with mp 193–195° C.
- IV. Isorhamnetic 3-glucoside, $C_{22}H_{22}O_{12}$, with mp 166–169° C, $[\alpha]_D^{20} -59.8^\circ$.
- V. Scutellarein, $C_{21}H_{18}O_{12} \cdot H_2O$ (a sample for comparison was kindly given to us by V. I. Glyzin), with mp 210–213° C, $[\alpha]_D^{20} -131.2^\circ$.
- VI. Chlorogenic acid, $C_{18}H_{18}O_9$, with mp 200–203° C, $[\alpha]_D^{20} -34.0^\circ$.
- VII. Arbutin, $C_{12}H_{16}O_7$, with mp 152–153° C, $[\alpha]_D^{20} -59.0^\circ$.

Scutellarein 7-O- α -L-rhamnopyranoside (VIII) and substance IX are new compounds. The glycoside VIII, with empirical formula $C_{21}H_{20}O_{16}$, mp 233–235° C, $[\alpha]_D^{20} -96.0^\circ$, was identical with the monoside sorbifolin [1].

The flavonoid IX, mp 244–247° C, according to preliminary results, is a new bioside with the sugar residues L-rhamnose and D-xylose. The sequence of their attachment is the same as in sorbifolin, i. e., the L-rhamnose is attached to the aglycone and D-xylose is the terminal sugar. The position of attachment was determined on the basis of the UV spectra [3, 4]. It was established that the sugar component is present at C₍₇₎. In the aglycone there are free hydroxyl groups in positions 5, 7, 3', and 4'. The structure of the glycone has not yet been finally elucidated. For substance III it was shown by a zirconium–citric acid test [2] and by UV spectroscopy [3, 4] that the glucuronic acid is attached to the aglycone in position 3.

By two-dimensional paper chromatography we have investigated the leaves of nine species of the genus Sorbaria A. Br. It was found that S. assurgens Wilm et Boiss., S. kirilowii Bge., and S. tomentosa (Lindl.) Rend. contain new substances—sorbifolin, VIII and IX; S. species, S. stellipila Maxim contain VIII and IX and S. aitschisonii Hemsl., S. altaica Hort., S. tomentosa (Lindl.) Rehn. + S. Lindlejana Wall. (hybrid) contain VIII, and S. Lindlejana Wall. contains—of the compounds isolated—hyperoside, chlorogenic acid, and arbutin, which are common to all the species studied.

REFERENCES

1. V. G. Zaitsev, G. V. Makarova, and N. F. Komissarenko, KhPS [Chemistry of Natural Compounds], 5, 504, 1969 (in this issue).
2. L. Hörhammer and R. Hansel, KhPS, 286, 425, 1953.
3. T. A. Geissman, The Chem. of Flavonoid Compounds Pergamon Press, N. Y., 107, 1962.
4. V. I. Litvinenko and N. P. Maksyutina, KhPS [Chemistry of Natural Compounds], 1, 420, 1965.

8 July 1969

Khar'kov Pharmaceutical Institute

Khar'kov Chemical and Pharmaceutical Scientific-Research Institute