

FUROCOUMARINS FROM THE ROOTS OF ANGELICA BREVICAULIS

N. S. Ignat'eva and G. K. Nikonov

Khimiya Prirodnykh Soedinenii, Vol. 2, No. 6, p. 436, 1966

The present communication gives the results of a study of the lactones that we have found in the roots of Angelica brevicaulis (Rup.) (Archangelica brevicaulis (Rchb.)), a perennial herbaceous plant of the family Umbelliferae (collected in the region of Przheval'sk, KirgSSR).

A preliminary study showed that the roots of the plant contained 4.34%, and the fruit 1.58%, of total coumarin derivatives. These consist of mixtures of the same components, with R_f 0.90, 0.80, 0.75, 0.71, 0.60, and 0.03 [in the petroleum ether (bp 40°–60° C–benzene–methanol (5:4:1) system on paper impregnated with 10% of formamide in methanol]. Absorption chromatography on a column of acidic alumina (activity grade II, 30 × 7.5 cm) and elution with ethyl alcohol gave 26 fractions. We have isolated five individual lactones by rechromatographing the fractions and repeated recrystallization from benzene and methanol. From the elemental analysis, melting point, IR spectrum, and mixed samples, these substances were identified as the furocoumarins pimpinellin, isobergaptin, isopimpinellin, bergaptin, and sphondin.

Attention is attracted by the peculiar composition of the furocoumarin complex of Angelica brevicaulis, which is distinguished by the simultaneous presence of isomeric pairs of substances of the psoralen and angelicin series: isopimpinellin and pimpinellin, bergaptin and isobergaptin.

31 May 1966

Sechenov First Moscow Order of Lenin Medical Institute

5-O-DESMETHYLNobiletin FROM ASTER ALTAICUS

A. T. Troshchenko and T. I. Limasova

Khimiya Prirodnykh Soedinenii, Vol. 2, No. 6, p. 436, 1966

We have investigated the chemical composition of Aster altaicus Willd. collected in 1963 in the Gornyi-Altai Oblast.

The epigeal part of the plant was extracted with petroleum ether. On standing, the concentrated extract deposited an amorphous brown precipitate which was recrystallized three times from methanol. This gave yellow silky needles with mp 143°–145° C. Yield 0.02% of the air-dry herb. With ferric chloride, the substance gave a green coloration, and it also gave a positive reaction for flavones with zinc dust and hydrochloric acid.

Elemental analysis shows that the substance obtained has the composition $C_{20}H_{20}O_8$ and contained 38.92% of methoxy groups. UV spectrum: λ_{max} 254, 284, 344 m μ (log ϵ 4.078; 4.461; 426, respectively). The spectrum is characteristic for flavones [1].

The properties of this compound are very similar to those of 5-O-desmethylnobiletin (5-hydroxy-6, 7, 8, 3', 4'-pentamethoxyflavone) [2].

On methylation with dimethyl sulfate for 54 hr, the substance was converted into nobiletin (5, 6, 7, 8, 3', 4'-hexamethoxyflavone) with mp 136°–137° C. Its melting point and UV spectra agreed with literature data [3, 4].

Demethylation of the substance isolated from the plant by means of hydriodic acid gave 5, 6, 7, 8, 3', 4'-hexahydroxyflavone [5].

Methylation of this compound with diazomethane [6] gave 5-O-desmethylnobiletin identical with that obtained from the plant.

We obtained the same 5-O-desmethylnobiletin by treating the nobiletin that we had prepared, with aluminum chloride in ethereal solution at room temperature.