COUMARINS OF THE EPIGEAL PART OF *Caragana frutex*

V. V. Boinik, V. N. Kovalev,
N. F. Komissarenko, and V. I. Dikhtyarev

UDC 547.9:582.736

Plants of the genus *Caragana*, family Fabaceae are represented in the world flora by 80 species of which 35 grow on the territory of the USSR in the form of shrubs and semishrubs [1].

Analysis of information in the literature shows that of the plants of this genus *C. jubata* Poir. (shagspine pea shrub) and *C. arborescens* Lam. (Siberian pea shrub) have been studied chemically, and flavonoids, saponins, tanning substances, vitamins, carbohydrates, and fatty and essential oils have been detected in them [2, 3].

C. frutex C. Koch. (Russian pea shrub) has been studied inadequately in the chemical aspect. A preliminary chemical investigation of its epigeal part has shown the presence in it of not fewer than eight substances of flavonoid nature, seven coumarin derivatives, five saponins, and five phenolcarboxylic acids.

The raw material for the investigation was collected in the environs of Khar'kov in the flowering phase. The raw material was extracted with aqueous ethanol, and the aqueous ethanolic extract was concentrated to an aqueous residue and was then treated with organic solvents.

We give the results of a study of the substances consisting of coumarin derivatives. For their isolation, a chloroform extract was evaporated and poured into water, and the resulting precipitate was filtered off. The filtrate was treated successively with petroleum ether and chloroform. Column chromatography on silica gel (the eluting solvents being petroleum ether, benzene, chloroform, and mixtures of them) yielded five coumarins, designated as substances (I-V). The petroleum ether fraction yielded substances (I) and (II) and the chloroform fraction substances (III-V).

Substance (I), composition $C_{12}H_8O_4$, mp 188-191°C, λ_{max} (methanol) 247 and 297 nm, was identified as bergapten.

Substance (II), composition $C_{12}H_8O_4$, mp 145-146°C, λ_{max} (methanol) 248 and 298 nm, was identified as xanthotoxin.

Substances (III-V) were identified as umbelliferone, esculetin, and scopoletin, respectively.

The substances isolated were identified by their chromatographic behavior and physicochemical properties, and by comparison with authentic samples [4].

This is the first time that substances (I-V) have been isolated from the species studied.

LITERATURE CITED

1. G. A. Kozlechkov, Author's Abstract of Candidate's Dissertation, Alma-Ata (1965), p. 25.
2. A. Umarov, Author's Abstract of Candidate's Dissertation, Leningrad (1976), p. 20.
3. L. K. Klyshev, V. A. Bandyukova, and L. S. Alyukina, Plant Flavonoids [in Russian], Alma-Ata (1978), p. 220.
4. G. A. Kuznetsova, Natural Coumarins and Furocoumarins [in Russian], Leningrad (1976), p.248.

Khar'kov Pharmaceutical Institute. All-Union Scientific-Research Institute of the Chemistry and Technology of Medicinal Agents, Khar'kov. Translated from Khimiya Prirodnykh Soedinenii, No. 6, pp. 780-781, November-December, 1983. Original article submitted April 21, 1983.

 0009-3130/83/1906-0742$07.50