

N. N. Guzhva, M. S. Luk'yanchikov,  
V. B. Ushakov, and L. S. Sarkisov

UDC 615.322:547.814.5

In order to find the most promising species of the genus *Astragalus* as sources of flavonoid compounds, we have studied the chemical composition of *Astragalus captiosus* Boriss. family *Fabaceae*.

In the epigeal part of the above-mentioned species collected in the flowering period in the mountain regions of the Karachai-Cherkess Autonomous Region we detected eight flavonoid substances.

The combined substances were isolated and purified by known methods [1] and were subsequently deposited on a column of polyamide sorbent. The column was eluted with aqueous ethanol in increasing concentrations. The individual substances obtained were recrystallized from ethanolic and aqueous ethanolic solutions.

Substance (I),  $C_{15}H_{10}O_7$ , mp 310-312°C,  $\lambda_{\max}$  375, 265 nm, was quercetin.

Substance (II),  $C_{21}H_{20}O_{12}$ , mp 237-240°C,  $[\alpha]_D^{20}$  -69.2° (s 0.1; methanol),  $\lambda_{\max}$ , 362, 255 nm, was quercetin 3-O- $\beta$ -D-glucofuranoside, or isoquercitrin.

Substance (III),  $C_{27}H_{30}O_{16}$ , mp 190-192°C,  $[\alpha]_D^{20}$  -35.5° (s 0.4; methanol),  $\lambda_{\max}$ , 365, 258 nm, was quercetin 3-O-[O- $\alpha$ -L-rhamnopyranosyl-(6  $\rightarrow$  1)- $\beta$ -D-glucopyranoside] or rutin.

Substance (IV),  $C_{27}H_{30}O_{16}$ , mp 193-194°C,  $[\alpha]_D^{20}$  -48° (s 0.2; methanol),  $\lambda_{\max}$ , 360, 255 nm, was quercetin 3-O-[O- $\beta$ -D-galactopyranosyl-(6  $\rightarrow$  1)- $\beta$ -L-rhamnopyranoside].

Substance (V),  $C_{21}H_{20}O_{11}$ , mp 178-180°C,  $[\alpha]_D^{20}$  -69° (s 0.48; methanol)  $\lambda_{\max}$ , 350, 265 nm, was kaempferol 3-O- $\beta$ -D-glucopyranoside, or astragalin.

Substance (VI),  $C_{22}H_{22}O_{12}$ , mp 170-172°C,  $[\alpha]_D^{20}$  -30° (s 0.4; methanol),  $\lambda_{\max}$ , 357, 255 nm, was isorhamnetin 3-O- $\beta$ -D-glucopyranoside.

The structures of substances (VII) and (VIII), having a biosidic nature, are being refined.

The structures of the substances isolated were confirmed by the results of elementary analysis, of UV and IR spectroscopy, and of a study of the products of acid, alkaline, and enzymatic hydrolyses, and also by comparison with authentic samples.

The quantitative determination of the combined flavonoids was carried out by a photoelectrocolorimetric method using the azo-coupling of flavonoid substances in an alkaline medium with diazotized sulfanilic acid. The amount of flavonoids were calculated in terms of rutin on the basis of a calibration graph, and it amounted to 3.20%.

It was shown in experiments on animals that the combined flavonoids from *A. captiosus* possess hypolipidemic and hypotensive actions.

## LITERATURE CITED

1. A. L. Kazakov, M. S. Luk'yanchikov, S. F. Dzhumyrko, and V. A. Kompantsev, *Khim. Prir. Soedin.*, 388 (1981).