

PHENOLIC COMPOUNDS FROM SEVERAL *Polygonum* SPECIES

G. G. Nikolaeva, M. V. Lavrent'eva, and I. G. Nikolaeva\*

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The genus *Polygonum* L. (Polygonaceae) is represented in the flora of Siberia by 23 species that are used to treat inflammatory diseases of the kidneys and gastrointestinal tract. *P. aviculare*, the herb of which is used for diseases of the lymphatic system and kidney-stone illness and as a tonic and hemostatic agent, has been described in Tibetan medicine under the name “bri-ta-sa-dzin.” The Tibetan name “nya-lo” corresponds to the species *P. divaricatum* and *P. amphibium* L. [1, 2]. The herb and roots of these plants are used for inflammatory diseases of the stomach, intestines, gall bladder, uterus, and bladder [3]. The chemical composition of *P. aviculare* has been studied most. The phenolic compositions of *P. divaricatum* L. and *P. angustifolium* Pall. have been reported [4]. Phenolcarboxylic acids and flavonoids have been isolated from *P. amphibium* [5].

Our goal was to study the phenolic composition of the aerial part of four *Polygonum* species (*P. divaricatum*, *P. angustifolium*, *P. amphibium*, and *P. aviculare*) by HPLC.

The phenolic composition of the *Polygonum* plants was studied by HPLC for groups of compounds using isocratic elution. Three groups of compounds were examined, phenolcarboxylic and hydroxycinnamic acids (gallic, protocatechoic, chlorogenic, ferulic, caffeic, *p*-coumaric) (I), flavonoid glycosides (rutin, hyperoside, luteolin-7-glycoside, isoquercetin, avicularin, cosmosiin, kaempferol glycoside) (II), and flavonoid aglycons (luteolin, quercetin, apigenin, kaempferol) (III).

TABLE 1. Compounds in the Aerial Part of *Polygonum* Species Observed by HPLC

Compound	Retention time, min	Compound peak height, mm			
		<i>P. divaricatum</i>	<i>P. angustifolium</i>	<i>P. amphibium</i>	<i>P. aviculare</i>
Gallic acid	2.8	7	7	10	12
Protocatechoic acid	3.9	7	15	10	16
Chlorogenic acid	4.5	8	5	15	14
Ferulic acid	7.6	–	7	13	–
Caffeic acid	8.0	9	16	9	9
<i>p</i> -Coumaric acid	11.9	13	9	13	13
Rutin	4.6	7	44	7	11
Hyperoside	5.8	25	71	14	64
Luteolin-7-glycoside	6.5	10	–	–	10
Isoquercetin	7.0	12	25	21	21
Avicularin	8.7	18	43	24	50
Cosmosiin	9.9	5	–	10	5
Kaempferol glycoside	11.1	13	25	16	10
Luteolin	8.0	10	–	–	10
Quercetin	8.5	36	43	36	45
Apigenin	14.2	16	–	8	10
Kaempferol	16.2	10	10	15	16

Institute of General and Experimental Biology, Siberian Branch, Russian Academy of Sciences, 670047, Ulan-Ude, fax: 83012 43 30 34, e-mail: i-nik@mail.ru. Translated from *Khimiya Prirodnikh Soedinenii*, No. 5, pp. 616–617, September–October, 2009. Original article submitted March 25, 2009.

Specimens of the aerial parts of the species were collected at the beginning of July 2008 in Ivolgin, Zaigraev, Selengin, Mukhorshibir, and Bichur regions of Buryatia during full flowering. The optimal ratios of solvents for the mobile phase were selected beforehand. For this, artificial mixtures of compounds from the groups of compounds were used. The sharpest separation of compounds occurred using mobile phases of CH<sub>3</sub>CN:CH<sub>3</sub>CO<sub>2</sub>H (2%) in the ratios 15:85 (I), 20:80 (II), and 36:74 (III). Compounds were identified by retention times. Table 1 lists the chromatography results.

All specimens contained hydroxycinnamic and phenolcarboxylic acids (gallic, protocatechoic, chlorogenic, caffeic, *p*-coumaric), flavonoid glycosides (rutin, hyperoside, isoquercetin, avicularin, kaempferol glycoside), flavonoid aglycons (quercetin, kaempferol). Ferulic acid was found in specimens of *P. angustifolium* and *P. amphibium*; luteolin-7-glycoside and the aglycon luteolin, in specimens of *P. divaricatum* and *P. aviculare*; cosmosiin and apigenin, in specimens of *P. divaricatum*, *P. amphibium*, and *P. aviculare*. The results provide an additional signature of the species independence of the investigated *Polygonum* species.

## REFERENCES

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