Chemistry of Natural Compounds, Vol. 39, No. 5, 2003

B R I E F C O M M U N I C A T I O N S

COMPARATIVE PHYTOCHEMICAL INVESTIGATION OF THE COMPOSITION AND CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES IN *Marrubium vulgare* AND *M. alternidens*

N. V. Kurbatova, R. A. Muzychkina, N. M. Mukhitdinov, and G. N. Parshina

UDC 547.972

Of 15 known species of *Marrubium* L. (Lamiaceae Lindl.), *M. vulgare* L. and *M. alternidens* Rech. grow in Kazakhstan [1].

The aerial parts of these and other species of horehound are medicinal materials that are used mainly as spasmolytic, hypotensive, cholagogic, and sedative agents [2-5].

The therapeutic effect is due to the presence in these plants of essential oils, terpenoids (marrubiin, peregrinol, marrubiol, peregrinin, tetrahydroperegrinin, dihydroperegrinin, phytol), flavonoids, phenolic acids, alkaloids (stachydrine), phenols, coumarins, amino acids, carbohydrates, tanning agents, and saponins.

M. vulgare L. is included in the pharmacopoeias of Greece, Portugal, America, and other countries [3-6].

Kazakhstan specimens of horehound collected in the Almaty district have been studied. The raw material was extracted with solvents of various polarity (H_2O, 10, 30, 50, 70, and 95% alcohol, acetone, 50% acetone, ethylacetate, benzene) at room temperature for 3 d and with heating for 1-10 h on a boiling-water bath. The optimal extractants for qualitative and quantitative extraction of the components were water and 50% alcohol. The component composition was investigated. The quantitative content of the principal biologically active substance (BAS) groups was determined [7] for the development stages (Table 1). A phytopreparation with anti-oxidant activity was obtained.

TABLE 1. Quantitative Content (%) of Principal BAS Groups in the Aerial Parts of *Marrubium vulgare* and *M. alternidens*

Compound	*M. vulgare*			*M. alternidens*		
	1	2	3	1	2	3
Amino acids	8.37	6.29	0.39	7.45	5.85	0.44
Polysaccharides	0.05	0.17	0.30	0.06	0.11	0.31
Tanning agents	5.2	6.0	2.0	5.7	7.0	2.2
Acids	8.0	7.2	5.1	6.9	6.3	4.7
Flavonoids	1.7	1.6	1.5	1.5	1.1	1.0
Phenols	1.57	1.24	0.93	1.38	1.02	0.74
Essential oils	0.09	0.06	0.03	0.10	0.07	0.05
Coumarins	0.022	0.023	0.016	0.024	0.025	0.011
Saponins	1.40	1.53	0.56	1.29	1.33	0.37
Alkaloids	0.08	0.05	0.02	0.07	0.06	0.03

Budding (1), flowering (2), fruiting (3)

Al-Farabi Kazakh National University, 480012, Almaty, ul. Karasai Batyra, 95a, fax (3272) 74 26 09, e-mail: abilov@KazSU.kz. Translated from Khimiya Prirodnykh Soedinenii, No. 5, pp. 410-411, September-October, 2003. Original article submitted May 27, 2003.

0009-3130/03/3905-0501$25.00

One- and two-dimensional paper chromatography and TLC with specific developers [8] and authentic specimens identified the following substances: glucose; fructose; maltose; saccharose; fluoroglucinol; caffeic, cinnamic, hydroxycinnamic, *o*-coumaric, and syringic acids; rutin; quercetin; myricetin; histidine; proline; tryptophan; phenylalanine; tyrosine; asparagine; and arginine.

Thus, the comparative study showed that amino acids, phenolic and free organic acids, flavonoids, phenols, tanning agents, and saponins dominate during budding and flowering of Kazakh species of horehound. These vegetative stages are used for industrial preparation. Both species are recommended for practical use in medicine. Common horehound was approved by the RK VFS [9]. *M. alternidens* is recommended as an equally valuable substitute for the first species.

REFERENCES

1. *Flora of the Kazakh SSR*, (1963), Vol. 7, 400.
2. T. A. Vinogradova, B. N. Gazhev, V. M. Vinogradov, and V. K. Martynov, *Practical Phytotherapy, Complete Encyclopedia* [in Russian], OLMA-PRESS, Moscow (1998).
3. P. D. Sokolov, ed., *Plant Resources of the USSR* [in Russian], Neva, St. Petersburg (1991).
4. V. I. Zavrazhnov, R. I. Kitaeva, and K. F. Khmelev, *Medicinal Plants of Central Chernozem´* [in Russian], Nauka, Voronezh (1972).
5. Kh. Kh. Khalmatov, *Wild Medicinal Plants of Uzbekistan* [in Russian], Fan, Tashkent (1964).
6. D. P. Popa and L. A. Salei, *Khim. Prir. Soedin.*, 384 (1973).
7. *State Pharmacopoeia of the USSR*, XIth Ed., No. 2, Meditsina, Moscow.
8. R. A. Muzychkina, *Reactions and Reagents for Chemical Analysis of Certain BAS Groups in Medicinal Plant Material* [in Russian], Nauka, Almaty (2002).
9. VFS RK 42-746-2002, *Common Horehounds* [in Russian].