HIGHER TERPENOIDS OF SOME SPECIES OF Labiatae

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In Marrubium vulgare L. [1] and Stachys silvatica L. (family Labiatae) [2], which we have studied previously, diterpenoids of the labdane and kaurane series were found. We have studied the qualitative and quantitative compositions of the higher terpenoids of seven other species of plants of this family collected in the flowering phase in the Kalarash region of the Moldavian SSR (Table 1).

Concentrated acetonic extracts of the epigeal part of the plants were filtered to eliminate the bulk of the ursolic acid (if it was present in the plant), the filtrate was evaporated to dryness, the residue was freed from waxes and acids, and each fraction was chromatographed on silica gel (1:25). The acid fraction was previously methylated with diazomethane.

As can be seen from Table 1, in all the extracts we found the diterpene alcohol phytol n_D^{22} 1.4636; $[\alpha]_D$ +1.7° and β-sitosterol (mp 137°C). From four species we isolated a triterpenoid – ursolic acid, mp 275-276°C (ethanol) – which amounted to more than 50% of the extract in the case of Glechoma hirsuta and Acinos thymoides. In some species the ursolic acid is accompanied by betulin (mp 251-252°C, $[\alpha]_D$ +20°C), which was eluted from chromatograms with benzene–ether (1:1). No triterpenoids were found in three of the seven plants studied.

From the acid fractions of all the extracts we also isolated octadec-3-enoic acid [3], the structure of which was confirmed by its oxidative cleavage with $KMnO_4$ to pentadecanoic acid.

All the substances isolated were identified by TLC, and also by a comparison of physical constants and IR spectra with corresponding characteristics of known samples; in the case of ursolic acid, it was first converted into uvaol by reduction with $LiAlH_4$.

TABLE 1. Amounts of Higher Terpenoids in Some Species of Labiatae (% on the weight of the air-dry plant)

Species of plant	Phytol	Ursolic acid	Betulin	β-Sitosterol
Acinos thymoides Moench.	0,05	1 40	0,05	0,06
Ballota nigra L.	0,07	—	—	0,08
Clinopodium vulgare L.	0,04	1,40	—	0,07
Glechoma hirsuta W. et K.	0,06	0,63	0,01	0,07
Lamium amplexicaule L.	0,10	—	—	0,06
Prunella vulgaris L.	0,05	0,44	—	0,06
Scutellaria altissima L.	0,10	—	—	0,05

LITERATURE CITED

1. D. P. Popa, G. S. Pasechnik, and Fan Thuk An, Khim. Prirodn. Soedin., 345 (1968).
2. D. P. Popa and G. S. Pasechnik, Khim. Prirodn. Soedin., No. 4, 447 (1974).
3. Dictionary of Organic Compounds [in Russian], Vol. 3, Moscow (1949), p. 302.

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