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Komarov Botanical Institute, AS USSR

INVESTIGATION OF THE TRITERPENES IN SOME SPECIES OF PLANTS

A. D. Zorina, L. G. Matyukhina, and A. A. Ryabinin

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In the investigation of certain plants, various substances have been isolated and identified: from the roots of *Fagus taurica* Popl., β-sitosterol (I) and betulinic acid (II), and from the roots of *Juglans regia* L., β-sitosterol (III) and betulin (IV). In the epigeal parts of *Salvia beckeri* Trautv. we have found betulin (V) and in *Cornus mas* L. ursolic acid (VI). Ursolic acid (VII) has also been isolated from the stems of *Periploca graeca* L.

The substances isolated and their derivatives have the following melting points, °C:

Substance	Natural compound	Acetate	Methyl ester	Acetate of the methyl ester
(I)	134–135	117–118	—	—
(II)	—	—	219–221	205–207
(III)	135	116–118	—	—
(IV)	—	213–216	—	—
(V)	256	217–218	—	—
(VI)	277–280	—	—	241–243
(VII)	271–274	—	162	237–239

The results of the analysis of the substances isolated and their derivatives agreed with the calculated figures. The melting points of all the compounds agreed with those given in the literature. Their identity with authentic samples was confirmed by the mixed melting point method.

The general method of isolating the substances consisted of extraction with chloroform, separation of the neutral and acidic fractions, chromatography of the neutral substances on alumina (activity grade III) and of the acids on deactivated alumina, and recrystallization from various solvents.

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A TRITERPENE GLYCOSIDE FROM *GYPSOPHILA PATRINII*

V. G. Bukharov and S. P. Shcherbak

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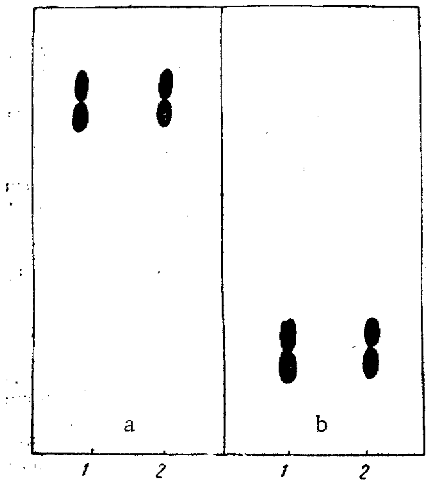
Kochetkov, Khorlin, and Ovodov isolated a saponin, gypsoside, from *Gypsophila pacifica* and established its structure as a nonaoside of gypsogenin [1]. The same saponin was later found in *Gypsophila paniculata* [2].

The extraction of the roots of a gypsophila (*Gypsophila patrinii*) collected in the Altai with methanol gave 20% of extract (of the weight of the roots). By means of ion-exchange chromatography on Dowex-1 resin, we isolated a glycoside with decomposition point 175°–185° C, $[\alpha]_D^{18}$ +26±3° (c 4.0; water), mp of the acetate 177°–178° C, $[\alpha]_D^{18}$ +10± 3° (c 1.9; chloroform). The yield of purified glycoside was 5% of the extract.

As the results of a comparison of the constants obtained with those given by the authors mentioned [1] have shown, this glycoside and, particularly, its acetate, have low specific rotations. The same discrepancy has recently been reported by Amanmuradov, Kondratenko, and Abubakirov, who isolated gyposide from Acanthophyllum gypsophiloides [3].



Chromatographic behavior of the glycoside and gypsoside. a) Paper chromatogram of the glycoside from G. patrinii (1) and gypsoside (2) in system 1; b) thin-layer chromatogram on silica gel of the glycoside from G. patrinii (1) and gypsoside (2) in system 2 (4 : 1 : 5).

Our study of the chromatographic behavior of the glycoside and an authentic sample of gypsoside (the sample was provided by A. Ya. Khorlin) on paper (Leningrad type "B", spots revealed with $SbCl_3$ in chloroform) and on a thin fixed layer of silica gel in the following systems: 1) isopropanol–ethanol–diethylamine (1 : 1 : 1), and 2) butanol–acetic acid–water (4 : 1 : 5) and (5 : 1 : 4) showed their complete identity. Both on paper and on silica gel two forms of the glycoside were clearly seen (figure) with R_f 0.75, 0.84 and 0.20, 0.30, respectively, which well agree with literature data [1].

The hydrolysis of the glycoside with 5% hydrochloric acid and subsequent separation of the aglycone fraction on a column of silica gel gave gypsogenin (eluted with a mixture of benzene and ether (4 : 1)) with mp 265°–267° C, α_D^{19} +95± 3° (c 1.0; alcohol) and also in very small yield another product, apparently a glucopyranoside of gypsogenin [3] (elution with methanol) with mp 200°–202° C; main frequencies in the IR spectrum: 3400 (OH), 1730 (C=O), 1700 ($C=O_{carb}$) cm^{-1}.

The same sugars as in other species of gypsophila were found in the hydrolyzate: galactose, glucose, xylose, arabinose, rhamnose, and fucose.

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Abruzov Institute of Organic and Physical Chemistry, AS USSR