

# STEROID SAPONINS

## XV. PRELIMINARY CHARACTERIZATION OF THE STEROID

### GLYCOSIDES FROM *Polygonatum latifolium*

P. K. Kintya, A. I. Veleva,  
and G. V. Lazur'evskii

UDC 547.917+547.918

The detection of steroid saponins in some species of *Polygonatum* has been reported previously [1, 2].

We have isolated the total saponins from the epigeal part of *Polygonatum latifolium* (Jacq.) Desf. and have separated them by repeated chromatography into nine individual compounds called in order of increasing polarity polygonatosides A, B, C, D, E, F, G, proto-E, and proto-G. Polygonatosides A and B were identified by their melting points  $[\alpha]_D$  values, and chromatographic mobilities in TLC with markers as trillin and (25R)-furost-5-en-3 $\beta$ -22 $\alpha$ ,26-triol 26-O- $\beta$ -D-glucopyranoside, respectively, which was also confirmed by acid hydrolysis with the production of diosgenin and glucose. In the NMR spectra of polygonatosides B, proto-E, and proto-G after they were boiled with methanol the signals of a methoxy group appeared at 3.15 ppm, which is characteristic for a C<sub>22</sub> methyl ketal [3] and shows their furostanol nature. Polygonatosides A, C, D, E, F, and G give a negative reaction with Ehrlich's reagent [4], and, consequently, have a spirostanol structure, and the remainder give a positive reaction and belong to the furostanol series. Protopolygonatosides E and G undergo enzymatic cleavage by  $\beta$ -glucosidase [5] with the formation of their spirostanol analogs, namely, glycosides E and G, respectively. From the results of full and enzymatic hydrolysis and mass and NMR spectroscopy, the aglycone of protopolygonatosides E and G is (25R)-furost-5-ene-3 $\beta$ ,22 $\alpha$ ,26-triol. The acid hydrolysis of polygonatosides C, E, G, proto-E, and proto-G gave the aglycone diosgenin, identified by its melting point,  $[\alpha]_D$  value, and IR and mass spectra. In the case of polygonatosides D and F, the aglycones have not yet been identified since they were isolated in only small amounts. The monosaccharide compositions of the polygonatosides determined by means of paper chromatography were:

Polygonatoside	Aglycone	Monosaccharide composition
A (trillin)	Diosgenin	Glucose
B	(25R)-furost-5-ene-3,22,26-triol	Glucose
C	Diosgenin	Galactose, glucose
D	—	Glucose, rhamnose
E	Diosgenin	Galactose, glucose, xylose
F	—	Glucose
G	Diosgenin	Xylose, galactose, glucose, arabinose
Proto-E	(25R)-Furost-5-ene-3,22,26-triol	Galactose, glucose, xylose
Proto-G	(25R)-Furost-5-ene-3,22,26-triol	Galactose, glucose, arabinose, xylose

#### LITERATURE CITED

1. L. S. Chetverikova, V.I. Kichenko, and L. M. Utkin, *Trudy VILAR*, **11**, 202 (1959).
2. L. I. Strigina and E. V. Kol'chun, *Khim. Prirodn. Soedin.*, 396 (1972).
3. G.-A. Hoyer, W. Sucrow, and D. Winker, *Phytochemistry*, **14**, 539 (1975).
4. S. Kiyosawa and M. Hutoh, *Chem. Pharm. Bull.*, **16**, 1162 (1968).
5. R. Tscheshe, A. Harz, and J. Petricic, *Chem. Ber.*, **107**, 53 (1974).

Institute of Chemistry, Academy of Sciences of the Moldavian SSR, Kishinev. Translated from *Khimiya Prirodnikh Soedinenii*, No. 5, pp. 670-671, September-October, 1976. Original article submitted May 13, 1976.

This material is protected by copyright registered in the name of Plenum Publishing Corporation, 227 West 17th Street, New York, N.Y. 10011. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission of the publisher. A copy of this article is available from the publisher for \$7.50.