

N. E. Mashchenko, P. K. Kintya,  
and G. V. Lazur'evskii

UDC 547.924+547.918

We have previously reported the isolation of compounds of the tetracyclic series from cucumber seeds [1]. Other authors have described the isolation from various plants of the genus *Cucurbitifaciae* of various  $\Delta^7$ -sterols [8] and also of the 6-O-palmitate and 6-O-stearate of the  $\beta$ -glucosides of stigmasterol, stigmastanol, and  $\beta$ -sitosterol [3, 4].

We have studied the sterols present in the seeds and rind of cucumbers (variety "teplichnyi"). A methanol extract of the cucumber seeds was separated on a column of silica gel, using first benzene and then benzene-ether systems with gradually increasing concentrations of the ether to elute the sterols. The sterol fatty acid esters (1) were eluted with benzene and the free sterols (2) with 16% ether in benzene. To isolate the sterol glycosides (3) we used 5% methanol in ether.

Similar operations were performed with a methanolic extract of the rind, from which we obtained mainly a sterol glycoside and only traces of free sterols. Each of the fractions obtained was purified preparatively on plates of silica gel.

The ester fractions obtained after purification were saponified with 10% NaOH (5 h). The sterols were extracted with ether, purified on silica gel plates with Rhodamine, and acetylated with subsequent separation on plates of silica gel impregnated with  $\text{AgNO}_3$ . The products were identified with the GLC and TLC methods in the presence of markers. Both the first and the second fractions were found to contain the acetate of  $\beta$ -sitosterol, of stigmasterol, and of stigmasta-7,22,25-trien-3 $\beta$ -ol. In the aqueous extract obtained after alkaline saponification palmitic, stearic, linoleic, and linolenic acids were identified in the form of their methyl esters by GLC. The fraction containing the sterol glycoside was hydrolyzed with 10%  $\text{H}_2\text{SO}_4$  (10 h). Stigmasta-7,22,25-trien-3 $\beta$ -ol was found as the aglycone, and this was confirmed by physicochemical methods of analysis (mobility on TLC, mass spectrum, melting point). In the carbohydrate fraction we found glucose; methylation of the glucose followed by methanolysis gave methyl 2,3,4,6-tetra-O-methyl-D-glucose.

The sterol glucoside obtained is glycoside A which we isolated previously from cucumber seeds [1].

The results of a quantitative determination of glycoside A in all three fractions showed that the sterol glycoside is present mainly in cucumber rind, while the bulk of the free sterols and their esters are present in the seeds. On the basis of these facts, it may be assumed that in the growth of the plant the glycoside is hydrolyzed by enzymes present in this plant and the sterols so produced accumulate in the seeds.

## LITERATURE CITED

1. P. K. Kintya, N. E. Isaeva, V. Ya. Chirva, and G. V. Lazur'evskii, *Khim. Prirodn. Soedin.*, 306 (1972).
2. W. Sucrow and A. Reimerdes, *Z. Naturforsch.*, 23b, 42 (1968).
3. P. Tunmann and W. Frank, *Arch. Pharmaz.*, 305, 469 (1972).
4. P. Tunmann and W. Frank, *Z. Naturforsch.*, 25b, 760 (1970).

Institute of Chemistry, Academy of Sciences of the Moldavian SSR. Translated from *Khimiya Prirodnikh Soedinenii*, No. 5, pp. 660-661, September-October, 1975. Original article submitted April 8, 1975.

© 1976 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 \$15.00.