

E. G. Él'yashevich, G. A. Drozd,
K. E. Koreshchuk, N. I. Bezuglaya,
V. I. Manych, and L. I. Shestak

UDC 547.972

The roots of *Acorus calamus* L., family Araceae (drug sweetflag) are widely used in medicine [1]. In the preparation of the raw material, the epigeal part, the weight of which is several times that of the rhizome, is discarded. In the literature available to us, we have found no information on the chemical composition of the epigeal part. There are only statements on the finding of an essential oil in the leaves and some information on its chemical composition [2].

We have studied the epigeal part of this plant, collected in the L'vov oblast in August. The yield of essential oil was 2.8-3.0%. The presence of 0.048% of coumarins was established by known methods [3, 4].

Flavonoids were detected by the cyanidin reaction [5]; Bryant's test [6] showed their glycosidic nature. Chromatography on paper established the presence in the plant of about 10 substances. Hydrolysis of an extract of the epigeal part of drug sweetflag with 20% sulfuric acid for 48 h did not lead to the formation of aglycones. The results of supplementary investigations showed the presence of C-glycosides in the extract [7]. Column chromatography on Kapron led to the isolation of substance A with mp 222-226°C (decomp.), R_f (15% acetic acid, ascending method) 0.47; λ_{max} (in ethanol) 256, 270, and 350 nm. Products of ordinary acid hydrolysis were four compounds with R_f 0.19, 0.28, 0.39, and 0.47, one of which coincided with the initial substance. These compounds were isolated by preparative chromatography and were again subjected to acid hydrolysis. The same four substances were found in all the hydrolyzates. This shows that substance A is a C-diglycoside [8-10].

In a Kiliani hydrolyzate [11] treated similarly [12] luteolin was found as the aglycone and D-glucose as the carbohydrate component. UV spectroscopy did not show the presence of additional hydroxy groups in the aglycone as compared with substance A. A C-glycoside of luteolin - lucenin - has been described in the literature [9, 10]. The results of a direct comparison by paper chromatography of substance A and an authentic sample of lucenin (kindly provided by A. I. Tikhonov), and also of the products of their acid hydrolysis, showed that complete identity.

Thus, substance A has been identified as luteolin 6,8-C-diglucoside or lucenin. This is the first time that lucenin has been found in the family Araceae.

LITERATURE CITED

1. State Pharmacopoeia of the USSR [in Russian], Xth ed. (1968), p. 581.
2. M. Schantz, *Acta Bot. Fennica*, **59**, 138 (1958).
3. G. A. Kuznetsova, *Natural Coumarins and Furocoumarins* [in Russian], Leningrad (1967).
4. G. K. Nikonov, N. I. Rodina, and M. G. Pimenov, *Aptechnoe Delo*, No. 4, 41 (1963).
5. R. Willstätter, *Ber.*, **47**, 2874 (1914).
6. E. T. Bryant, *J. Am. Pharm. Ass.*, **39**, 480 (1950).
7. G. A. Drozd, N. S. Fursa, and V. I. Litvinenko, in: *Chemical Investigations in Pharmacy* [in Russian], Kiev (1970), p. 155.
8. V. I. Litvinenko and V. M. Darmograi, *Dopovidi Akad. Nauk Ukr. RSR*, Ser. B, No. 7, 639 (1968).
9. A. I. Tikhonov and P. E. Krivenchuk, in: *Chemical Investigations in Pharmacy* [in Russian], Kiev (1970), p. 161.

Zaporozhe Medical Institute. Translated from *Khimiya Prirodnikh Soedineni*, No. 1, p. 94, January-February, 1974. Original article submitted June 21, 1973.

© 1975 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.

10. M. K. Seikel and T. J. Mabry, *Tetrahedron Lett.*, 16, 1105 (1965).
11. H. Kiliani, *Ber.*, 8, 63 (1930).
12. G. A. Drozd, K. Koreshchuk, and V. I. Litvinenko, *Farmatsevt. Zh.*, No. 1, 56 (1969).