

## THE SAPONINS OF TWO SPECIES OF ERYNGIUM

M. T. Ikramov, R. L. Khazanovich,  
and Kh. Kh. Khalmatov

UDC 547.597+547.913

We have studied the saponins of the hypogeeal organs of Eryngium Biebersteinianum Nevski and E. octophyllum Eug. Kor.

The chloroform-deresinified raw material was treated with 80% methanol. The methanolic extract was chromatographed on a column of alumina. The saponins were eluted with 80% methanol. The aqueous residue after the evaporation of the methanol was treated repeatedly with n-butanol. The n-butanolic extracts were combined and concentrated. A precipitate deposited, which consisted of the total saponins; in aqueous solutions it formed a stable foam, and caused the hemolysis of blood.

The combined substances obtained were hydrolyzed with hydrochloric acid. Glucose was identified in the hydrolyzate by paper chromatography [butanol-1-ol-acetic acid-water (4:1:5)] in the presence of a "marker."

In a precipitate of the aglucone fraction we found four substances, with  $R_f$  0.06, 0.21, 0.38, and 0.58 [chloroform-ethyl acetate (2:1)], these  $R_f$  values not coinciding with those of the markers used - gypsogenin and betulin.

We assumed that the genins isolated were present in the bound form, and therefore we subjected them to alkaline hydrolysis. Now two new substances (I and II) appeared on the chromatograms.

The mixture obtained was separated on a column of silica gel in the chloroform-ethanol (10:1) system. The individual substances (I) and (II) were isolated.

Substance (I) formed colorless acicular crystals with mp 298-305°C, mol. wt. 506 (mass spectroscopy). On chromatographic investigation in a thin layer of silica gel in the chloroform-methanol (8:2; 9:1; and 11:1) systems, the  $R_f$  values of the substance corresponded to those of  $R_1$ -barrigenol. The acetyl derivative of the substance had mp 152-155°C, which, according to the literature [1, 2], corresponds to  $R_1$ -barrigenol acetate.

Substance (II) formed acicular crystals with mp 280-285°C. The mixture was identified by its melting point, IR spectrum, and  $R_f$  value as  $A_1$ -barrigenol [1, 2].

The alkaline hydrolyzate after the separation of substances (I) and (II) was acidified and extracted with ether. The ethereal extract was found to contain organic acids, and these are now being studied.

Thus, the aglucones of Eryngium Biebersteinianum and E. octophyllum are esters of  $A_1$ - and  $R_1$ -barrigenols with organic acids.

### LITERATURE CITED

1. K. Hiller, B. Linzer, S. Pfeifer, L. Tökes, and I. Murphy, *Die Pharmazie*, **23**, 376 (1968).
2. K. Hiller, M. Keipert, S. Pfeifer, L. Tökes, and M. L. Maddox, *Die Pharmazie*, **25**, 769 (1970).

---

Tashkent Pharmaceutical Institute. Translated from *Khimiya Prirodnikh Soedinenii*, No. 6, p. 843, November-December, 1971. Original article submitted June 22, 1971.

© 1971 Consultants Bureau, a division 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 \$15.00.