

FLAVONOIDS OF THE LEAVES OF *Evonymus japonicus*

N. V. Sergeeva and A. L. Shinkarenko

UDC 547.972

We have investigated the leaves of *Evonymus japonicus* (evergreen euonymus) collected in the environs of Sochi. The dry comminuted raw material was exhaustively extracted with 70% ethanol in the boiling water bath. The evaporated extract was purified repeatedly by treatment with chloroform and ether. Paper chromatography showed that it contained not less than six flavonoids.

The extract was deposited on a column of Kapron and was eluted with 50% ethanol. The fractions of the third zone, on evaporation, gave a residue consisting of two glycosides: (I) and (II). They were separated by precipitation with lead acetate. The lead complexes were decomposed with 30% H₂SO₄ and H₂S. The glycosides were recrystallized from aqueous ethanol.

Glycoside (I), with R_f 0.64 [system 1: butan-1-ol-CH₃COOH-H₂O (4:1:5)] and 0.65 (system 2: 2% CH₃COOH) formed light yellow crystals soluble in water, methanol, and ethanol, and insoluble in ether and chloroform. UV spectrum of (I): λ_{max} 356, 265 nm (C₂H₅OH). On the basis of the bathochromic shifts of the long-wave maximum in the presence of complex-forming and ionizing reagents it was established that the hydroxyls at C₅ and C₄ are free and those at C₃ and C₇ have substituents. Enzymatic and acid (1% H₂SO₄, 40 min in the boiling water bath) hydrolyses gave equimolecular amounts of kaempferol, D-glucose, and L-rhamnose. On partial hydrolysis (0.5% H₂SO₄, 5 min) glucose and a glycoside (Ia) were detected among the hydrolysis products. Glycoside (Ia) was extracted with ether and purified on Kapron. It had mp 233-236°C, R_f 0.70 (1) and 0.14 (2) and formed light yellow plates. Its UV spectrum (λ_{max} 365, 265) showed that there is a substituent at C₇. Hydrolysis formed kaempferol and rhamnose.

Glycoside (II), with mp 186-184°C, * R_f 0.48 (1) and 0.56 (2) formed light-green prisms soluble in water and ethanol, and insoluble in chloroform and ether. UV spectrum of (II): λ_{max} 360, 257 nm (C₂H₅OH). Acid hydrolysis gave quercetin, D-glucose, and L-rhamnose in equimolecular amounts. On partial hydrolysis, L-rhamnose and a glycoside (IIa) were found among the products. The glycoside (IIa) had mp 221-223°C, R_f 0.60 (1) and 0.31 (2) and formed greenish yellow crystals with λ_{max} 351, 257 nm. Hydrolysis gave quercetin and D-glucose. The UV spectrum shows that the glucose is attached at C₃. On the basis of the facts presented, enzymatic hydrolysis, and IR spectra, we consider that glycoside (I) is kaempferol 3-O-β-D-glucoside 7-O-β-L-rhamnoside, and (II) is quercetin 3-O-β-D-glucoside 7-O-α-L-rhamnoside, which have been described in the literature [1]. The flavonoids of Japanese euonymus have not been studied previously.

LITERATURE CITED

1. L. Hörhammer, L. Stich, and H. Wagner, *Naturwissenschaften*, **46**, 358 (1959).

*As in Russian original - Publisher.

Pyatigorsk Pharmaceutical Institute. Translated from *Khimiya Prirodnikh Soedinenii*, No. 1, p. 118, January-February, 1972. Original article submitted September 23, 1971.

© 1974 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.