

We have previously [1] reported the isolation and identification of quercetin and hyperoside from *Artemisia dracunculus* L. (tarragon). In the present paper we give the results of a chemical study of four flavone substances.

To elucidate the nature of these substances we used alkaline cleavage, reduction, acid hydrolysis,  $R_f$  values on paper chromatography with markers, and also the absence of depressions of melting points of mixtures with authentic samples.

From an ethereal extract by preparative paper chromatography [ $C_6H_6-CH_3COOH-H_2O$  (125:72:3)] we isolated luteolin,  $C_{15}H_{10}O_6$ , mp 328-330°C (methanol) and kaempferol,  $C_{15}H_{10}O_6$ , mp 278-280°C (methanol).

When the aqueous extract after treatment with ether was chromatographed on polyamide, two substances were separated: bioquercetin,  $C_{27}H_{30}O_{16}$ , mp 210-203°C,  $[\alpha]_D^{22} -20.9^\circ$  (c 0.1, DMFA) and rutin,  $C_{27}H_{30}O_{16}$ , mp 183-186°C,  $[\alpha]_D^{20} -38^\circ$  (c 0.1, methanol). With magnesium in hydrochloric acid, both glycosides gave a dark-red coloration, and with Wilson's reagent a yellow coloration; they reduce an ammoniacal solution of silver nitrate.

The products of acid hydrolysis (2% hydrochloric acid, 100°C, 1 h) yielded the aglycone-quercetin, mp 310-312°C (yield 50%). In the case of rutin, the hydrolyzate yielded by paper chromatography L-rhamnose and D-glucose, and in the case of bioquercetin, L-rhamnose and D-galactose. The order of attachment of the sugars was determined by stepwise hydrolysis (0.1% hydrochloric acid in 50% methanol, 100°C). Positive reactions with aniline phthalate and diphenylamine reagents show that the linkage of the sugars in the bioses was 1-6. The attachment of the bioses at  $C_3$  of the glycosides was shown by the citric acid-zirconyl salt test.

By comparing the results obtained with literature data [2, 3], the substances isolated were identified as quercetin 3-[O- $\beta$ -D-galactofuranosyl-(6  $\rightarrow$  1)- $\beta$ -L-rhamnopyranoside] and quercetin 3-[O-D-glucofuranosyl-(6  $\rightarrow$  1)- $\beta$ -L-rhamnopyranoside].

## LITERATURE CITED

1. T. K. Chumbalov, M. M. Mukhamed'yarova, and O. V. Fadeeva, KhPS [Chemistry of Natural Compounds], 323 (1969).
2. N. P. Maksyutina, KhPS [Chemistry of Natural Compounds], 226 (1967).
3. I. I. Moniava and E. P. Kemertelidze, KhPS [Chemistry of Natural Compounds], 178 (1969).

\*Russian original - probably a misprint for 201-203°C (see [2]) - Publisher's Note.

Kirov Kazakh State University. Translated from *Khimiya Prirodnikh Soedinenii*, No. 5, p. 629, September-October, 1970. Original article submitted June 29, 1970.

© 1973 Consultants Bureau, a division of Plenum Publishing Corporation, 227 West 17th Street, New York, N. Y. 10011. All rights reserved. This article cannot be reproduced for any purpose whatsoever without permission of the publisher. A copy of this article is available from the publisher for \$15.00.