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# PRANCHIMGIN FROM CACHRYS ODONTALGICA

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The isolation of a substance 9 from C. odontalgica Pall, in addition to osthole, isoimperatorin, imperatorin, bergapten, and prangenin, has been reported previously [1]. Substance 9 melts at 141-142° C, has the general formula $C_{19}H_{20}O_5$, $[\alpha]_D^{20}$ −6.7 ( c 0.2; chloroform). On acid hydrolysis it is cleaved to form marmesin and 2,2-dimethylacrylic acid.

The cleavage products, $R_f$ values, IR spectra, and a mixed melting point show that substance 9 is pranchimgin [2].

The substances isolated from C. odontalgica, have also been found in Cryptodiscus didymus (Rgl.) Korov.

The sample of pranchimgin was kindly supplied to us by G. A. Kuznetsova.

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# SPECTROPHOTOMETRIC DETERMINATION OF THE AMORPHIN IN AMORPHA FRUIT

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The UV spectrum of the rotenoid glycoside amorphin [1] has two absorption maxima— $[\alpha]_D^{20}$—6.7 and 294 mμ (log ε 4.23). The second maximum is more suitable for quantitative spectrophotometric determination of the substance.

On this basis, we have developed a method for the quantitative determination of amorphin in plant raw material. The method of determining rotenoids based on the measurement of the optical density at two points of the absorption curve [2] is unsuitable for unpurified extracts because of the presence of foreign rotenoids in them. Chromatography in a thin layer of silica gel was used to separate the amorphin from the accompanying substances.

About 1.1 g (accurately weighed) of comminuted Amorpha fruit was defatted by being steeped in petroleum ether five times and was then dried and was shaken with 95% ethanol in a 50-ml measuring flask for 3 hr. A narrow (1.5 cm) reference band was separated on a glass plate (11 × 19 cm) with a thin layer of KSK silica gel fixed with gypsum. Two milliliters of the extract was deposited at the starting line of the main band and 0.1-0.2 ml at the control band, and chromatography was carried out by the ascending method in the benzene—methanol (3 : 1) system. The control band was treated with concentrated sulfuric acid and the amorphin zone in the main band was outlined by reference to the light pink spot of amorphin in the reference band (between 3.5 and 7.5 cm from the starting line) and this zone was then transferred to a column (2 × 20 cm). The amorphin was eluted with 95% ethanol to give 25 mm of eluate. The desorption of the amorphin from the silica gel took place almost completely, but to obtain more objective results 1 ml of a solution of standard amorphin (11 mg in 25 ml of ethanol) was chromatographed under the same conditions on another plate and the eluate was used as the standard solution.

The optical densities of the test and standard solutions were measured on an SF-4 instrument at a wavelength of 294 mμ in a cell 1 cm thick. 95% ethanol was used as the blank.

The content of amorphin in the raw material, % (X) was calculated from the formula:

$$X = \frac{a \cdot b \cdot C_{st} \cdot D_x}{10 \cdot m \cdot v \cdot D_{st}},$$

where $a$ is the volume of ethanolic extract of the plant raw material, ml;

b is the volume of the ethanolic eluate from the column, ml;

$C_{st}$ is the concentration of the standard solution, mg/ml;

$D_x$ and $D_{st}$ are the optical densities of the test and standard solutions, respectively;

m is the weight of the plant material, g; and

v is the amount of extract deposited on the plate, ml.

When standard amorphin is not available, the calculations can be carried out according to a well-known formula, using the specific absorption coefficient of amorphin ($E^{1\%}_{1cm} = 242$).

The content of amorphin in ripe fruit of Amorpha fruticosa varied between 0.65 and 0.76%.

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# RUTIN IN SOME SPECIES OF ONOBRYCHIS ADANS

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In a study of the composition of 16 species of Onobrychis—sainfoin—growing in Georgia, it was shown that all the plants are rich in flavonoids.

The present paper gives the results of a study of those sainfoins which contain mainly rutin with only small amounts of other flavonoids.

To isolate the rutin, the raw material was extracted with 80% methanol. After the methanol had been driven off, the aqueous liquid was purified with chloroform, and left to crystallize [1]. The substance that separated out was recrystallized from methanol. In this way from Onobrychis cyri we isolated a flavonoid with mp 184-185° C, $[\alpha]_D^{20}$ −37° (c 1.4; pyridine); from O. iberica a flavonoid with mp 185-186° C, $[\alpha]_D^{20}$ −37.9° (c 1.4; pyridine); and from O. inermis a flavonoid with mp 183-184° C, $[\alpha]_D^{20}$ −37.8° (c 1.4; pyridine). After the hydrolysis of the flavonoids, in all cases only quercetin was obtained in an amount of approximately 50%. Rhamnose and glucose were found in the carbohydrate moiety.

Mixed melting points of the rutins isolated and their aglycones gave no depression of the melting points; they also had the same IR and UV spectra and $R_f$ values as authentic samples of rutin and quercetin.

The amount of rutin was determined in nine species of sainfoin. For this purpose the extracts of the material investigated [2] were separated on a plate coated with polyamide [mobile phase methanol—ether—ethyl acetate (1 : 1 : 1)]. The rutin zone was separated and eluted, and the amount of rutin was determined on an SF-4A spectrophotometer at 258 mμ. The yield was calculated from a calibration curve for pure rutin. It was found that the content of rutin in O. cyri is 1.9%; in O. iberica, 2%; in O. inermis, 1.8%; in O. daghestanica, 2.9%; in O. kluchorica, 2.3%; in O. transcaucasica, 1.52%; in O. altissima, 1.43%; in O. hamata, 1.48, and in O. kemularia, 1.8%.

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