

CARBOHYDRATES OF RHEUM TATARICUM. I

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We have studied the free and combined carbohydrates of the roots, leaves, and seeds of Rheum tataricum L. fil. (Tatar rhubarb) collected in the Syugaty valley, Alma-Ata Oblast in May 1964. The freshly-gathered material was fixed with chloroform. The carbohydrates were extracted with 80% ethanol until the reaction with α -naphthol was negative.

To isolate the carbohydrates from the accompanying substances and to separate the free and combined sugars we used absorption chromatography on kapron powder. The free mono- and oligosaccharides were desorbed with water until the reaction with α -naphthol was negative, and the combined carbohydrates were eluted with methanol until the reaction with AgNO_3 at 105° C was negative [1, 2].

The qualitative analysis of the carbohydrates was carried out by ascending chromatography on "Leningrad rapid" paper. The total carbohydrates and reference samples were deposited on sheets of paper (32.5 × 32.5 cm) at distances of 3 cm from one another and were chromatographed in the solvent systems butan-1-ol-acetic acid-water (40:1:5) (I) and butan-1-ol-acetic acid-water (40:12.5:29) (II). The following sugars were identified: glucose, fructose, xylose, saccharose, and, in the form of traces, lactose or mellibiose.

The total of bound sugars was subjected to hydrolysis with 2% sulfuric acid for 5 hr in a boiling water bath before chromatography. After the extraction of the aglycone with ether, the hydrolyzate was neutralized with barium hydroxide (to congo red). Chromatography was carried out as in the case of the free sugars. Glucose and rhamnose were found.

The quantitative determinations were carried out by spectrophotometry and the absorption maxima of the spots of the carbohydrates separated by paper chromatography and stained with o-toluidine and urea as the most specific revealing agents permitting the determination of the superposed spots of aldoses and ketoses [3].

The measurements were carried out on a SF-4A spectrophotometer. The colorations of the aldoses with o-toluidine were measured at a wavelength of 510 m μ and that of the ketoses at 410 m μ . The calculation was carried out with reference to a standard curve obtained from known carbohydrates.

In this way it was found that the following sugars are contained in the free state in the roots of the Rheum tataricum: glucose (1.01%), fructose (2.02%), and saccharose (1.1%); in the leaves: glucose (4.75%), fructose (3.35%), and traces of lactose or mellibiose; and in the seeds: glucose (2.15%), fructose (4.3%), and traces of xylose and mellibiose.

The following sugars are present in the combined form in Rheum tataricum - in the roots: glucose (1.03%); in the leaves: glucose (0.025% and rhamnose (0.21%); and in the seeds: glucose (1.05%) and rhamnose (1.02%).

REFERENCES

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