FLAVONOIDS OF Alhagi kirgisorum

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From a methanolic extract of the epigeal part of Alhagi kirgisorum Schrenk (camel's thorn) by chromatography on polyamide we have isolated substance (I) with mp 160-162°C, $[\alpha]_D^{20}$ −44.2° (c 0.26; DMFA); mp of its acetate 185-187°C, $[\alpha]_D^{20}$ −181° (c 0.135; CH_3OH).

When compound (I) was hydrolyzed (2% HCl, 100°C, 2 h), an aglycone was obtained with mp 303-305°C (mp of the acetyl derivative 204-206°C) which was identified from the products of alkaline fusion and its chromatographic behavior in various systems as isorhamnetin. The hydrolyzate was found by paper chromatography to contain D-glucose and L-rhamnose. The quantitative acid hydrolysis of compound (I) showed a ratio of aglycone to carbohydrates of 1:3 and of rhamnose to glucose of 1:2.

On the basis of the bathochromic shifts in the UV spectrum obtained in the presence of ionizing and complex-forming reagents, it was established that the sugars are attached to the isorhamnetin in positions 3 and 7.

The stagewise hydrolysis of compound (I) (0.1% HCl in 50% CH_3OH, 4 h at 100°C) yielded substance (II) with mp 250-252°C, which was, according to the results of alkaline, acid, and enzymatic hydrolysis and UV and IR spectroscopy, isorhamnetin 7-α-L-rhamnofuranoside.

The alkaline hydrolysis of compound (I) (0.5% KOH, 100°C, 3 h) led to the formation of substance (III) with mp 188-190°C [1]. Oxidative degradation with hydrogen peroxide showed the presence of a biose in position 3 [2]. Hydrolysis with 1% formic acid (100°C) [3] and with 0.1% HCl in 50% CH_3OH (100°C) gave an aglycone and a biose. Aniline phthalate showed up the biose in the form of a brown spot, and diphenylamine–p-anisidine showed it in the form of a blue-green spot. A 1→6 arrangement of the bond was shown by periodate oxidation [4] and by enzymatic hydrolysis with rhamnodiastase.

Judging from the rate of hydrolysis of (III) and from the formation of a fairly stable biose, it may be assumed that the glucose attached directly to the aglycone is present in the furanose form and the second glucose residue in the pyranose form. Substance (III) was hydrolyzed by emulsin, which shows the β configuration of the glycosidic bond. From the results obtained, substance (III) was characterized as isorhamnetin 3-[6-β-D-glucopyranosyl-β-D-glucofuranoside].

Thus, substance (I) is isorhamnetin 3-[6-β-D-glucopyranosyl-β-D-glucofuranoside]-7-α-L-rhamnofuranoside.

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