

KAEMPFEROL GLYCOSIDES FROM THE  
FLOWERS OF *Alcea nudiflora*

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*Alcea nudiflora* Boiss, family Malvaceae, a plant growing widely in the foothills of central Asia and the Altai [1], has not been investigated for flavonoids.

The flowers - cream-colored and large - were collected in July-August, 1969 in the neighborhood of the village of Aktash, Tashkent region. The flavonoids were extracted with methanol. The combined flavonols were separated on Kapron. Two individual crystalline flavonols were obtained. One had the composition  $C_{21}H_{20}O_{11}$ , mp 217-218°C (from ethanol),  $R_f$  0.76 [butan-1-ol-acetic acid-water (4:1:5)]; UV spectrum,  $cm^{-1}$ : 350, 265 ( $C_2H_5OH$ ); 365, 275 ( $+CH_3COONa$ ); 355, 265 ( $+H_3BO_3$ ); 400, 275 ( $AlCl_3$ ). The acetate formed cream-colored needles, mp 204-205°C (from 80% acetone). Acid and enzymatic hydrolysis yielded glucose and kaempferol (1:1), mp 277°C (from ethanol); acetate - cream-colored needles, mp 185°C (from 50% acetone).

When the glycoside was methylated with dimethyl sulfate and then subjected to acid hydrolysis, the trimethyl ether of kaempferol with mp 150°C was obtained. An alcoholic solution of this ether gave a chestnut brown coloration with ferric chloride which shows that it has the structure of 5,7,4'-tri-O-methylkaempferol [2]. The IR spectrum of the glucoside (Fig. 1) differs from that of isoastragalin [3]. The differential IR spectrum (Fig. 2) has three bands in the 1010-1100  $cm^{-1}$  region which shows the pyranose form of the glucose.

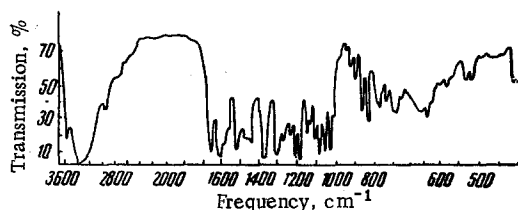


Fig. 1. IR spectrum of astragalin.

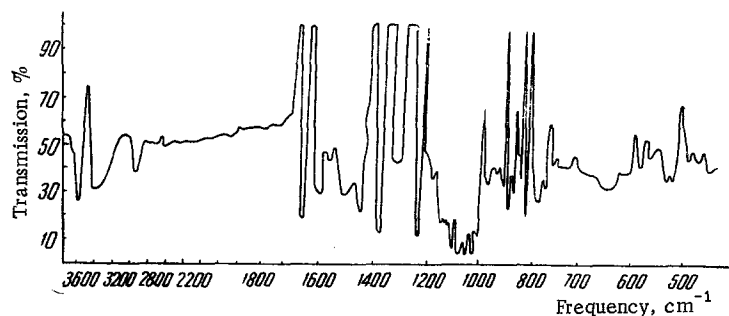


Fig. 2. Differential IR spectrum of astragalin.

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Thus, the glucoside is kaempferol 3-O- $\beta$ -D-glucopyranoside, which has been described under the name of astragalin [4, 5].

The second flavonol had mp 248–250°C,  $R_f$  0.86, and proved to be identical with the isostragalin that we have isolated previously from cotton flowers [3]. The enzymatic hydrolysis of isostragalin with a preparation of Aspergillus oryzae did not lead to the cleavage of the glucoside, which confirms its  $\alpha$ -glucosidic form.

#### LITERATURE CITED

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