FLAVONE BIOSIDES OF COLCHICUM SPECIOSUM

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We have isolated two flavone glycosides from freshly-cut petals of Colchicum speciosum Stev. (showy autumn-crocus), family Liliaceae.

Substance I forms light yellow crystals with mp 212–214° C. The UV spectrum has maxima at 348–350 and 255–266 mμ (in CH_3OH). From the bathochromic shifts in the presence of ionizing and complex-forming additives the compound was shown to have free hydroxyl groups in positions 5, 3', and 4', while they were absent from positions 3 and 7 as was confirmed by color reactions [1].

On mild acid hydrolysis (1% H_2SO_4, 60 min, or 15% acetic acid, 3 hr at 100° C), 1 mole of D-glucose, a monoside, and luteolin were formed. In its physicochemical properties, the monoside is identical with luteolin 7-β-D-glucopyranoside. On more severe hydrolysis (8% H_2SO_4, 4 hr), 2 moles of D-glucose and luteolin were obtained.

Under the action of emulsin, after 6 hr the substance was split, first into D-glucose and luteolin 7-β-D-glucoside and then into the aglycone. This shows the presence of a β-glucosidic bond and the absence of a 1 → 2 linkage between the D-glucose molecules [2]. Under the action of weak solutions of alkalis (0.005 N solution of caustic soda at 74–75° C) the glycoside is cleaved during the first 5–10 min, which is characteristic for the disaccharide laminaribiose with a 1 → 2 linage [3].

On the basis of these results, we assumed that this compound is luteolin 7-O-β-D-glucopyranosyl-(1 → 3)-β-D-glucopyranoside (luteolin 7-β-D-laminaribioside).

Substance II formed yellow crystals with mp 234–238° C. The UV spectrum has maxim at 335 and 268 mμ (in CH_3OH) which is characteristic for apigenin derivatives. It was shown to contain free hydroxyl groups at $C_{(5)}$ and $C_{(4)}$, and also a sugar residue on carbon atom 7.

The IR spectrum of the substance showed the presence in it of associated hydroxyl groups of the carbohydrate part of the molecule (broad unsymmetrical band at 3410–3415 cm^{-1}), a carbonyl group (1660 cm^{-1}), aromatic bonds (1615, 1595, 1575, 1510 cm^{-1}), and a substituent in position 4' (830 cm^{-1}) [4].

Acid hydrolysis (8% H_2SO_4, 4 hr) gave D-glucose, D-xylose, and apigenin. Partial hydrolysis (15% aqueous acetic acid or 80% formic acid in cyclohexanol with heating) lead to the formation of apigenin 7-β-D-glucopyranoside. On enzymatic hydrolysis with emulsin, the substance underwent cleavage after 48 hr (presence of a β-glycosidic linkage); it was not cleaved by amylase.

Hydrolysis with 1% H_2SO_4 on heating yielded a small amount of a disaccharide which was identified by color reactions as sambubiose [5]. Thus, this substance can be characterized as apigenin 7-O-β-D-glucopyranosyl-(1 → 2)-β-D-xyloside.

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