

PLANT POLYSACCHARIDES

II. A STUDY OF THE CARBOHYDRATES OF *Alcea rosea*

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From the flowers of cultivated species of the black double form of the hollyhock, variety Naira, *Alcea* [*Althea*] *rosea* f. *nigra* we have isolated a mucilaginous polysaccharide (PS) [1] with a yield of 5%. It consisted of an amorphous pink powder which, on being dissolved in water, formed a colloidal solution with η_{rel} 6.0 (*c* 2.0; H₂O). The polysaccharide had MM 40,000 and contained nitrogen (0.7%) and protein (3.5%), the latter including the following amino acids (%): lysine, 0.3; histidine, 0.2; valine, 0.1; glycine, 0.4; serine, 0.1; threonine, 0.1; glutamic acid, 0.6; aspartic acid, 0.5.

The complete acid hydrolysis of the PS and the identification of its monosaccharide composition by PC in the butanol-pyridine-water (6:4:3) system and by GLC (in the form of aldononitriles) [2] showed that it consisted of Gal, Glc, Man, Ara, Xyl, and Rha in a ratio of 2:1.2:1:7.4:tr.:34, respectively, and of GalUA and GlcUA. The predominant monosaccharides were rhamnose and arabinose.

From the supernatant alcoholic solution after the precipitation of the PS we obtained a viscous syrupy concentrate of a dark red pigment with a peculiar odor and a specific gravity of 1.18 that contained 50 g/liter of pigmentary substances. The pigmentary substances were analyzed by PC in the ethyl acetate-formic acid-water (75:15:15) and the *n*-butanol-acetic acid-water (40:12:28) systems. The pigment included anthocyanidin glycosides: cyanidin, peonidin, delphinidin, and malvidin.

After the isolation of the PS, the residual meal yielded 11% of pectin substances (PCSs) [1]. They consisted of a free-flowing powder soluble in water with η_{rel} 5.4 (*c* 1.0; H₂O). The molecular mass of the PCs, determined viscometrically [3], was 37,000, their uronic acid content 58% (carbazole method) [4], and their O-CH₃ content 5.89%. In a hydrolysate of the PSs, by GLC we detected the following neutral sugars, in addition to the uronic acids: Rha, Ara, Xyl (11:3.5:1.0) and trace amounts of Man, Glc, and Gal.

Consequently, the PCSs belonged to the group of highly esterified pectins.

The amount of hemicellulose (HMC) in the hollyhock was 3.5%, and the hydrolysate of the HMC was found by PC to contain GalUA, GlcUA, Gal, Glc, Ara, and Rha.

Thus, the results of the investigation showed that the flowers of the black form of hollyhock can be used to obtain, successively, mucilaginous polysaccharides, a food dye, and pectin.

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