PECTIN SUBSTANCES OF ESSENTIAL-OIL CROPS

III. ISOLATION AND CHARACTERIZATION OF THE PECTIN OF *Salvia sclarea*

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We have previously [1, 2], considered the pectins of mint (*Mentha piperitae*) and the rose (*Rosa canina* L.). In the present communication we give information on the section isolated from the epigeal part of Clary sage (*Salvia sclarea* L.).

The pectin was isolated by the method described in the preceding paper [2]: yield 2.5%, $[\alpha]_D^{20}$ +213° (c 0.15; H_2O). It consisted of a flocculent white powder readily soluble in water and sparingly soluble in organic solvents. Elementary analysis (%): C, 34.62; H, 4.61; N, 3.02. The total hydrogen content agreed well with the NMR spectrum (RYa-2301 radiospectrometer). The titrimetric method [3] gave the following quantitative characteristics (%): free carboxy groups CF, 16.88; esterified carboxy groups CE, 4.48; degree of esterification, λ, 20.04; methoxy groups, CH_3O, 3.09.

The reduced viscosity determined graphically from the results for specific viscosity [4] was 4.0. The viscosimetric molecular weight M_w was 28.540 a.u. and the molecular weight calculated [5] with the correction for the mean weight of a unit (177 a.u. instead of 190 a.u.) was 30,874 a.u. (relative error 8.1%).

The following components were detected in the products of complete acid hydrolysis of the pectin by paper chromatography and ion-exchange chromatography (conditions identical with those given previously [2]): D-galacturonic acid and the monosaccharides rhamnose, mannose, arabinose, galactose, xylose, and glucose in a ratio of 4.0:1.0:6.3:3.4:2.8:1.2.

The acid hydrolysis and periodate oxidation of the pectin gave, respectively: a) Gal, Ara, and Xyl, and b) galacturonic acid Glc, Ara, Xyl, and traces of Gal.

Subsequent analysis of the products of exhaustive oxidation of the pectin (concentrated HNO_3, 20°C, 7 days) in the butanol—ethanol—pyridine—water (5:1:3:3) system revealed the presence of formic, oxalic, and tartaric acids. The products of the periodate oxidation of the galacturonan obtained by partial hydrolysis lacked carbohydrate residues, which excludes the presence of 1,3-linkage [6]. The IR spectra of the pectin and galacturonan gave the following characteristic peaks (cm^{-1}): 3400 m, 3200 w, 1740 m, 1630 s, 1392 s, 1320 w, 1224 m, triplet at 1090-1030-1000, 940 m, 818 w, and 705 m; and 3200 s, 2850 w, 1728 s, 1590 s, 1385 s, 1310 s, 1215 m, triplet at 1070-1020-984, 920 m, 860 w, 808 m, and 720 w.

Sage pectin, like rose pectin contains six monosaccharides [2] but in somewhat different proportions, and its galacturonan is constructed of D-galacturonic acid with the inclusion in the main chain of glucose, arabinose, and xylose, which are centers of branching for side chains in the form of 1,4-bound pyranose residues.

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