

PECTIC ACID FROM THE POLYSACCHARIDE COMPLEX
OF THE FLOWERS OF *Matricaria chamomilla*

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We have extracted the polysaccharides from the comminuted flowers of *Matricaria chamomilla* (German camomile) with hot water and precipitated them with ethanol. They were then reprecipitated three times from aqueous solutions. Yield 4-5% on the weight of the raw material; ash content 20-25%.

The polysaccharides were demineralized by treatment with KU-2 cation-exchange resin in the H^+ form and with AB-17 anion-exchange resin in the HCO_3^- form. Ash content 0.5%. Amount of uronic anhydride 45% (by potentiometric titration) [1].

The polysaccharides were hydrolyzed with 1 N H_2SO_4 ; the hydrolysis products were studied by paper chromatography. A uronic acid, galactose, arabinose, xylose (main components), and rhamnose and glucose (in small amounts) were detected.

In the literature [2], the polysaccharide complex of the German camomile is considered as a homogeneous product half of which consists of glucuronic acid residues. No other uronic acids are mentioned [2].

For fractionation, we performed the alkaline saponification of the polysaccharides under mild conditions at room temperature for 20 min. A 0.1 N solution of NaOH was added to a 3.5% aqueous solution of the polysaccharide complex. The total excess concentration of alkali in the solution was 0.03 N (0.12%). Then the alkali was neutralized with acid, a slight excess concentration of acid being created. The gel-like precipitate of polyuronic acid that formed was centrifuged off and washed with water (fraction I). Yield 30%. The solution after the first centrifuging was treated with ethanol (1:2), giving fraction II.

The main component of fraction I was a uronic anhydride (90%). Among the neutral monosaccharides we found by quantitative paper chromatography [3] xylose, arabinose, and galactose in a ratio by weight of 1:3.5:5; $[\alpha]_D + 280^\circ$. The fraction behaved as a homogeneous substance on reprecipitation as the Ca polyuronate [4] and on precipitation with Cetavlon [5]. The product was insoluble in water and in aqueous solutions of acids. It was soluble in water in the form of the sodium salt.

Fraction II contained 35% of a uronic anhydride and 65% of neutral sugars. It was readily soluble in water and in aqueous solutions of acids.

For the strict identification of the uronic acid of fraction I, the polysaccharide was partially hydrolyzed with 1 N H_2SO_4 for 6 h. The product of partial hydrolysis isolated from the hydrolysate was a destructured polyuronic acid. Yield 75%. It was converted into the methyl ester [6] and reduced with $NaBH_4$ [6].

The destructured polyuronic acid was converted into an almost neutral glycan. The amount of uronic anhydride was 7%. The glycan was hydrolyzed with 1 N H_2SO_4 , and the hydrolysate was studied by paper chromatography. Galactose and a uronic and an aldobiuronic acid were found. After appropriate treatment, crystals of D-galactose with mp 164-166°C, $[\alpha]_D + 81^\circ$, giving no depression of the melting point with an authentic sample, were isolated from the hydrolysate. The aldobiuronic acid split on acid hydrolysis into galactose and a uronic acid. The oxidation of the mixture of uronic and aldobiuronic acids gave mucic acid with mp 208-210°C.

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The results obtained show that fraction I consists to the extent of 90% of D-galacturonic acid residues and is therefore pectic acid.

The results of the investigation agree well with those for the polysaccharide composition of some representatives of the family Compositae, for example the sunflower [7].

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