2. The ester nature of the bond of the sulfuric acid residues with the primary and secondary carbon atoms of the galactose residues has been shown.

LITERATURE CITED


FRACTIONATION OF THE POLYSACCHARIDES OF *Chara aculeolata*

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The structure of the polysaccharides of *Chara* algae has been little studied [1, 2]. Continuing investigations in this field, we have fractionated these polymers.

The polysaccharides were isolated by the successive extraction of the alga with various solvents, and their amounts in the raw material were determined. To characterize the products isolated we studied the monomeric compositions of hydrolysates by various methods of chromatography, enzymatic hydrolysis, and spectrophotometry. In selecting the conditions for fractionation we started from the results obtained in a determination of the overall chemical composition of *Chara aculeolata* [3].

The scheme for fractionating the algae consisted of the following stages: isolation of the water-soluble substances, isolation of the substances soluble in ammonium oxalate, and isolation of the substances soluble in alkali.

The results of the fractionation are given in Tables 1-3. When the alga was treated with various solvents, more than 50% of the dry matter of the alga passed into solution, about 22% of it consisting of carbohydrate-containing polymers.

The amount of water-soluble polysaccharide (WSP) in the alga was 3.5%. In its hydrolysate glucose predominated and the other monomers were present in practically equal amounts, with the exception of rhamnose (see Table 3).

The fractionation of the total WSPs on Sephadexes C-75, 100, and 150 showed that they contained two fractions with different molecular weights differing in their monomeric composition. The polymer with the lower molecular weight had a neutral character and that of higher molecular weight an acid character.

The neutral polysaccharide was a starch-like substance, as was shown by: a) a positive reaction with iodine; b) the specific nature of the UV spectrum of its iodine complex; and c) a high degree of attackability by amylase.
The acidic polysaccharide was esterified with sulfuric acid residues and had a more complex monomeric composition. In addition to uronic acids it included residues of galactose, glucose, arabinose, xylose, and rhamnose.

The fraction isolated by ammonium oxalate amounted to more than 17% of the weight of the dry matter on the alga and contained the largest amount of carbohydrates (see Table 2). When the polysaccharide extracted by this solvent was hydrolyzed, considerable amounts of uronic acids were formed. The identification of the uronic acids by the PC method, and also their reduction to galactose, showed that they consisted solely of D-galacturonic acid. Its high proportion (>50%) in the polysaccharide isolated permits the assumption that this polymer belongs to the class of pectic substances.

Alkali-soluble polysaccharides are present in the algae in considerably smaller amounts. The fractions isolated by 5% KOH solution under various temperature conditions were practically identical in monosaccharide composition. The polymers extracted by 24% KOH solution contained smaller amounts of arabinose and galactose (see Table 3). Each of these polysaccharides gives a single peak on the gel filtration curve. Repeated reprecipitation of