has been found to be similar to that of Biloxi soybean.

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A NEW POLYSACCHARIDE FROM BLACK SPRUCE (PICEA MARIANA)

WHEN native lignin is isolated from black spruce (*Picea mariana*) with aqueous alcohol and the alcohol is distilled off under reduced pressure, a mixture of native lignin and resins separates from the remaining aqueous solution.[1] On saturating the aqueous filtrate with sodium sulfate, a polysaccharide separates as a flocculent precipitate which, after centrifuging and washing with 80 per cent. alcohol, then with absolute alcohol, and finally with ether and petroleum ether, is obtained as a light powder. After purification by prolonged electrodialysis and repeated precipitations by dropping a concentrated aqueous solution into absolute methanol, the polysaccharide is obtained as a white, nonhygroscopic powder in a yield of about 0.1–0.2 per cent. of the wood. It does not reduce Fehling solution before hydrolysis with hot dilute hydrochloric acid, but does so very strongly after this treatment. In spite of lengthy electrodialysis, it still contains 0.7 per cent. ash (determined as sulfate). It is very soluble in water, forming a slightly turbid solution similar to starch solutions. Its aqueous solution shows a slight levorotation which, after hydrolysis, changes to a strong dextrorotation. A hydrolysis curve, obtained by boiling the polysaccharide with 2 per cent. sulfuric acid, shows that a maximum reducing power of about 95 per cent. sugar (calculated as glucose) is reached after 6 hours. The presence of 0.7 per cent. MeO and a slight residue left after hydrolysis indicate that a small amount of lignin is still present which is difficult to remove because of the colloidal properties of the polysaccharide. On distillation with 12 per cent. hydrochloric acid, the polysaccharide gives 3.3 per cent. carbon dioxide, which corresponds to 13.2 per cent. uronic acid. When the polysaccharide is acetylated by heating it with a mixture of pyridine and acetic anhydride, a gelatinous suspension is formed from which an acetylated product is obtained which is insoluble in water and the common organic solvents.

A biochemical analysis[2] of the hydrolyzed polysaccharide by the method of Wise and Appling[3] shows the presence of 72.6 per cent. galactose, corresponding to 65.3 per cent. galactan. The polysaccharide also contains 13.1 per cent. arabinose (determined by the method of Wise and Peterson[4]) corresponding to 11.5 per cent. araban; glucose, mannose and xylose are absent. The presence of uronic acid, the levorotation and the insolubility of the acetylated derivative differentiate the polysaccharide from the arabogalactans isolated from certain larch species.[5,6] As the acetate of arabogalactan is soluble in organic solvents,[5] it is improbable that the polysaccharide is a mixture of arabogalactan and polyuronic acid because, in this case, the acetate should be at least partially soluble in organic solvents.

From the above analysis, it seems that the 3 components—galactose, arabinose and uronic acid—are present in the polysaccharide in a 4:1:1 molecular ratio.

A closer chemical investigation of this polysaccharide is in progress and the results will be reported at an early date.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE WATER MANOMETER FOR RECORDING INTESTINAL ACTIVITY[1]

EXPERIMENTS on intestinal activity *in situ* often fail because of unsatisfactory recording equipment. This tends to discourage performance of such experiments in student laboratories. This note describes a simple device for recording intestinal motility which has the advantage of economy, ease of construction and maintenance, and which may be readily adjusted to give a wide range of initial force distending the intestine. Furthermore, by the use of a lever, considerable amplification of changes in the manometer level may be obtained readily.

[1] F. E. Brauns, *Am. Chem. Soc.*, 61: 2120, 1939.

[1] Aided by a grant from the Fluid Research Fund of the Yale University School of Medicine.

[2] The author is indebted to Dr. P. Cundy, of the Analytical Department and Mr. J. F. McCoy, of the Bacteriological Department of the Institute, for carrying out the analyses.

[3] L. E. Wise and J. W. Appling, *Ind. Eng. Chem., Anal. Ed.*, 16: 28, 1944; 17: 182, 1945.

[4] L. E. Wise and F. C. Peterson, *Ind. Eng. Chem.*, 22: 362, 1930.

[5] F. C. Peterson, A. J. Barry, H. Ukauf and L. E. Wise, *Am. Chem. Soc.*, 62: 2361, 1940; and preceding papers.

[6] E. V. White, *Am. Chem. Soc.*, 64: 2838, 1942; and preceding papers.